

THE IRON AGE

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A GRADUATE engineer of the University of Delaware, K. L. Herrmann learned the tool-making trade with the American Die & Tool Co. and supplemented his college work with special studies in business management, foundry practice and metallurgy. Early in his career he became a tool designer for the Crocker-Wheeler Co., and later took the position of superintendent of the motor car repair and experimental work departments of the Automobile Club of America. In 1909 he joined the staff of the Studebaker Corp., serving successively as tool designer, general foreman, experimental engineer, assistant chief of the maintenance and service department, assistant engineer and consulting engineer. With the exception of the period from 1913 to 1917, during which he conducted a consulting engineering business in Detroit, he was associated with Studebaker until 1929, when he became connected with the Bantam Ball Bearing Co., of which he is now vice-president and general manager. Mr. Herrmann is a member of the Society of Automotive Engineers, American Society of Mechanical Engineers and Association of Iron and Steel Electrical Engineers.

SALES INCREASED BY DEVELOPING NEW LINES

By K. L. HERRMANN

Vice-president and general manager, Bantam Ball Bearing Co.

SINCE moving to South Bend in June, 1928, our company's total sales have increased each year, despite the fact that the demand for our standard line of ball bearings has consistently declined. During the past two years the decrease amounted to 63 per cent. The contraction of orders in our other products, which follow rather closely the general business trend, was of the same proportions. Moreover, in 1931 our sales to a single large customer fell off 60 per cent.

Yet, through the development of new lines, recruited from a special small order group, we were able not only to offset these heavy losses, but actually to show in 1930 a gain of 28 per cent in shipments, figured in dollars and cents, compared with 1929 and of 7 per cent last year as against 1930.

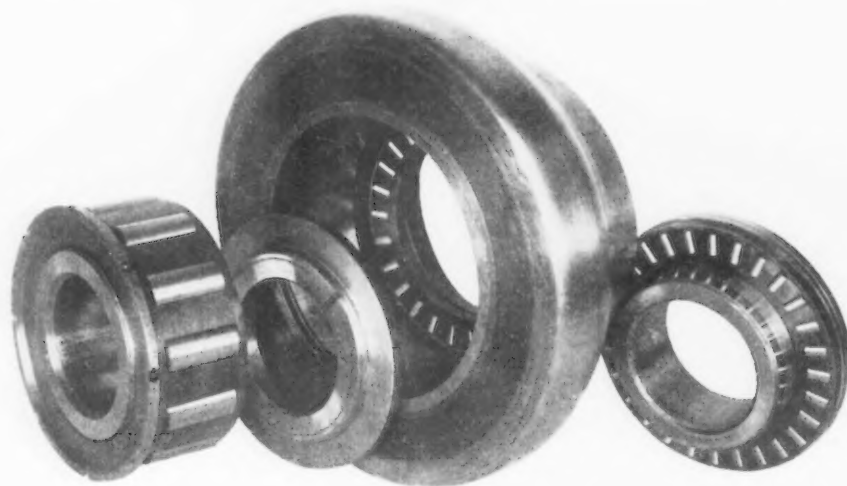
In the cultivation of new products during this period, it was necessary for us to purchase new equipment representing about 40 per cent of our present machinery inventory. We also had the expense accruing from heavy scrap losses while our employees learned to make every imaginable type of bearing, including free wheeling rolls. These rolls require a finish of unusual quality, a

strength averaging three times that long accepted as standard in the roll making industry and an accuracy greater than that in the manufacture of gages in leading tool making shops. All of this had to be done at a price which made it interesting and desirable for our customers to continue to use our products.

Necessity of Training Workmen Complicated Sales Plans

The steady increase in our sales was made under circumstances not confronting the average company. We moved to South Bend from Bantam, Conn., in the early part of 1928. During the first year and a half, much of our time and effort was devoted to enlisting the interest of local workmen in our company and training them for the skilled tasks involved in the manufacture of our products. At the end of 1928 the company's assets were seriously depleted and even the prosperous days preceding the stock market break in 1929 did not replenish our treasury to its former level.

When the Wall Street crash came we immediately anticipated changed conditions, deciding that business had been abnormal and that we must prepare to face a period comparable with



Special bearing used in a machine for cold rolling disk wheels at the Detroit plant of an automobile wheel maker.

pre-war days. We directed effort toward increasing our line of products by paying more attention to inquiries for bearings which could not be handled by using standard stock. We wrote all prospective customers, suggesting that we were in a position to make bearings for special requirements, at the same time advertising this fact in the leading industrial papers.

We made a strict rule that all inquiries must be answered the second day after they are received, sending with the reply a blue print of possible designs. This blue print must be a presentable drawing with as much special interest as possible put into the design. Heretofore of the stereotyped form, our catalog was enlivened by the revision of material and illustrations.

New Cost Method Introduced

Manufacturing costs were figured on a new basis. The expense of a product was based on all tangible material and labor plus the items usually considered as overhead. Where no accurate information was available for figuring costs in this manner, estimates were made, which in turn were revised as soon as more accurate data were obtained. In addition to the usual items, costs included traveling expenses of sales representatives; heat, light and power; compensation insurance; wrapping paper and boxes for shipping purposes; grinding wheels; tool bits, oils and grease, carbonizing compounds, etc. Aside from productive labor, the labor items consisted of maintenance or machine repair, inspection, direct supervision, wrapping and boxing, etc.

These details were essential, because grinding wheels used in grinding bearings, in some cases, cost more

than the total received for the bearings before proper costing methods were introduced. Taking the new methods as a basis and allowing an overhead consistent with depreciation of the machinery involved in a job, capital investment and permanent overhead, we were able to adjust our prices to customers so that business, as a rule, was taken at a reasonable profit.

Steps Taken to Assure Quick Estimating

Since we insisted upon submitting prices within two days on inquiries involving orders for special bearings, one of our chief problems was to work out a system of estimating properly the cost of such work. We solved it by laying out a series of material and labor estimates on imaginary sizes and designs of bearings. Later these were reduced to a volumetric basis, with factors for different designs and sections, so that prices could be quoted quickly with the least possible delay. Although this system did not always result in the closest possible estimates it proved satisfactory for practical purposes.

Because of our costing practice we could heavily depreciate machinery made obsolete by the falling off in sales of our standard products and

likewise pay for our new equipment without undue financial strain. It must be remembered that through this entire experience we were at no time flush with surplus funds. The management made monthly forecasts of orders, of expenditures and of our cash position, being governed thereby in taking on or developing new products, some of which were of a permanent nature and others for special jobs with no possibility of repetition.

To visualize better the company's financial condition in the 30 days ahead, each month the accounts receivable are listed on a single report sheet showing the new and variable accounts and those paid within certain usual dates. That is, columns are dated the eighth, eleventh, fifteenth, eighteenth, twenty-second, twenty-fifth and twenty-ninth. In them are listed the accounts receivable. In the column marked the eleventh, for example, are put all accounts receivable from the eighth to the eleventh; thus the sum of all the accounts set down in that column is the amount of money which the company expects to collect during that period.

Accounts payable are listed on another sheet under the following headings: 2 per cent by the 10th, 1 per cent by the 10th, 2 per cent by the 15th, 2 per cent by the 20th, and net. Most accounts fall into one of these groups. By comparing accounts receivable with accounts payable, we are able generally to pay promptly those having the larger discounts. Moreover, by examining the recapitulation of purchases and shipments, together with the forecast of orders expected, we are usually able to take advantage of discounts, although the net bills sometimes run 60 days.

Sales Forecast on Three-Month Basis

We attempt to forecast sales three months ahead. All prospective customers, with the probable amount of business from them for the next 90 days, are listed monthly. For the first month we include only the business of which we are reasonably sure; for the second and third months we

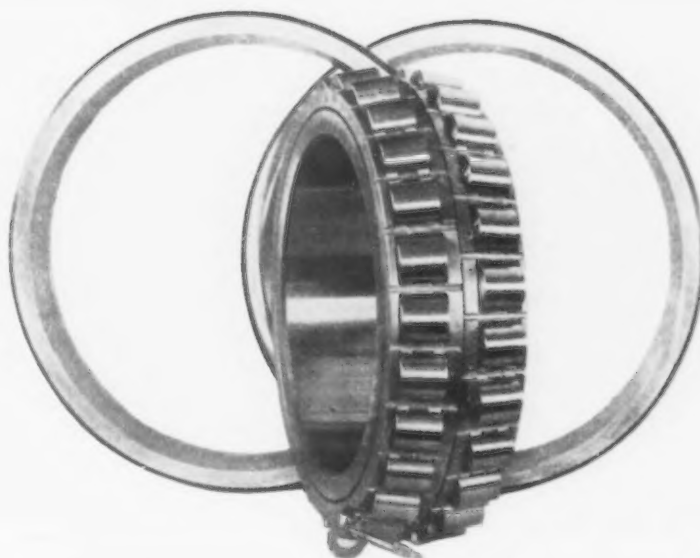
FEBRUARY 23rd, 1932				
2-1-32	A4949	2	Sample Bearing, per our B/P #0-551-A	AT ONCE
2-9-32	RS04973	1	Outer Steel Casing only for Messinger Brg.	AT ONCE
2-12-32	A4968	2	B-25 Spec. Bearings with Brze. Rets.	AT ONCE
1-25-32	A4915	1000	#LC-243 Washers per Blue Print	2-13-32
1-21-32	A4907	100	Frictionless Washers, 1" shaft, #821117 Po.00	2-18-32

The management keeps in close touch with all jobs going through the shop by means of a typewritten sheet, shown in part above. These, prepared every four or five days by the treasurer, list all work in process, showing the date the order was received, shop order number, short description of the work and date shipment should be made.

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DESPITE a decline of 63 per cent in orders for its standard line of products during the past two years, the Bantam Ball Bearing Co. showed a gain in total sales of 28 per cent in 1930 and 7 per cent in 1931 due to development of new lines. In this period new equipment was bought representing 40 per cent of the company's present machinery inventory, manufacturing costs were figured on a new basis and a method was established for handling inquiries promptly. The company is notably free from red tape and expensive tabulation of records, yet maintains an effective system for controlling production.

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Large two-row tapered roller bearing installed at the new strip mill of the Otis Steel Co. The outside diameter of the bearing is 28¾ in.

use a fraction in figuring the totals. This yardstick with which we measure future sales is not expected to be infallible as a guide, but has proved surprisingly accurate when the variables in a business of our type are considered.

At the beginning of every month our treasurer makes a forecast of our expenditures and of the value of our shipments for the next 30 days. We have discovered that this simple process has enabled us to know where we are going at all times and not run to the end of the month at a loss and then ask why. The forecast and its preparation give the treasurer an opportunity to seek out any leaks or loopholes and close them before they reach serious proportions.

"We operate efficiently with a notable absence of elaborate forms for controlling production and therefore are free from red tape and expensive tabulations and filing systems. Every four or five days the treasurer puts down on a single sheet all work in process, showing the date the order was received, our shop order number, a short description of the work, and the date shipment should be made. Copies are put in the hands of the plant superintendent and the chief inspector. This simple arrangement enables the management to keep its fingers on all jobs going through the shop.

At convenient intervals the treasurer and the plant superintendent get together and talk over the status of orders and the best procedure to follow in the shop. It may seem unusual that our treasurer's activities are so closely linked with production, but we have found this very bene-

ficial, because he then has the dual task of seeing that work gets out of the shop promptly so that the company can get its money and of keep-

ing customers satisfied with the service the company gives them and therefore willing to settle their financial obligations without delay.

Creep Tests on Cold-Drawn Bridge Wires

SUBSEQUENT to the substitution of cold-drawn wire originally used in the structures of the Ambassador Bridge between Detroit and Windsor, and the Mount Hope Bridge in Rhode Island, tests were made at Lehigh University to determine the creep of such wire under varying conditions. A brief summary of results was given on page 17 of THE IRON AGE of July 3, 1930. Somewhat more comprehensive data are given herewith.

About 3700 tons of wire was involved in the two bridges. The steel used was specified to be of acid open-hearth, with not more than 0.85 per

cent C, 0.04 per cent S, and 0.04 per cent P. Its diameter before galvanizing was 0.192 in., and it was drawn in lengths of not less than 2000 ft.

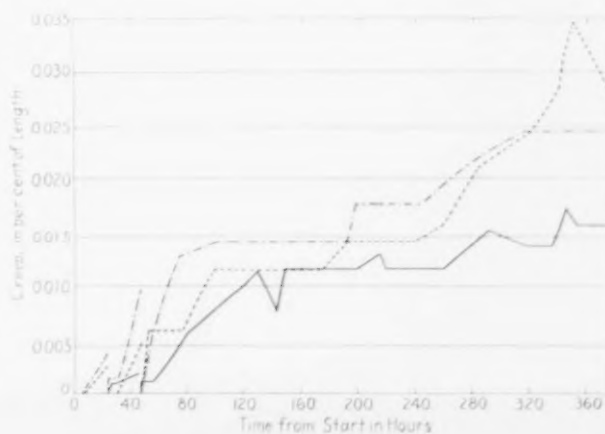
Prior to galvanizing the bright wire was required to bend, without breaking, around a rod one and one-half times its own diameter. After galvanizing its tensile strength on the gross cross-section was to be not less than 215,000 lb. to the sq. in., with minimum yield point 144,000 lb., and elongation at least 4 per cent measured on 10 in.

Special attention was paid to the
(Concluded on advertising page 20)

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CREEP observations on three samples of wire for two weeks. At left are the beginnings of creep movements of the three samples under the lower loadings for 24 and 48 hr. The load in each case, in the prolonged test, was about 111,000 lb. to the square inch.

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TOOL STEELS DIFFER IN

By B. F. SHEPHERD

Chief Metallurgist,
Ingersoll-Rand Co.,
Phillipsburg, N. J.

PRODUCTION of high-quality parts of tool steel requires control of the factors affecting the uniformity of the finished product. Design is criticized and altered to reduce the residual hardening stresses and prevent undue concentration of service stresses. The last word in hardening equipment, pyrometers, quenching sprays, etc., is used. Finally the steel is purchased from various sources to a chemical specification often demanding unreasonably close limits and certain physical cleanliness standards based on fracture and deep etching inspection. Inasmuch as all of these factors have been regulated, uniform results are expected.

Unfortunately, steel has a definite "personality," something which also characterizes human beings, cast in the same type of mold and probably having their chemical composition

within very narrow limits. The great confusion in existing data on steel is due to this difference in "personality"—a word which can be replaced to good advantage by the term "timbre." Steel may have a chemical composition entirely within a specification, and yet be entirely unsuited for a specific use. This is illustrated by the fracture of a piece of hardened tool steel containing an appreciable percentage of carbon in the form of graphite, shown in Fig. 1.

The steel fraternity, in times not long since past, called this difference in quality "body." This term in later years has been used to describe general quality characteristics and, very recently, the ability of tool steel to withstand repeated hardening without cracking—a test of rather doubtful value except for isolated special service requirements.

Timbre or Body Defined

Timbre has been defined by the Carpenter Steel Co. as the inherent "property of tool steel independent of analysis which influences the degree of hardness penetration and width of allowable quenching range."

It is the purpose of this paper to show some hardening irregularities in tool steel, the effect of timbre upon service life, the necessity for the control of timbre, the difference in timbre between the products of several manufacturers by means of the hardenability or timbre test* developed by the writer, and the degree of abnormality, with several illustrations showing that timbre exists not only in tool steel but also in various alloy steels. We may expect manufacturers of products having heavy duty service requirements to develop and adopt tests to control timbre of their materials, with lessening of the emphasis now being placed upon adherence to extremely narrow limits of chemical composition.

It is often assumed that the fact that parts pass a 100 per cent hardness inspection is a guarantee that the parts are satisfactory. Hardness tests only indicate the hardness at the particular location tested and are not a guarantee that a certain quality standard is being attained.

*B. F. Shepherd, "Inherent Hardenability Characteristics of Tool Steel," Transactions, American Society for Steel Treating, Vol. 17, January, 1930.

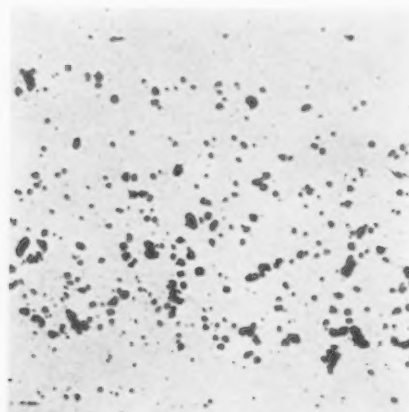
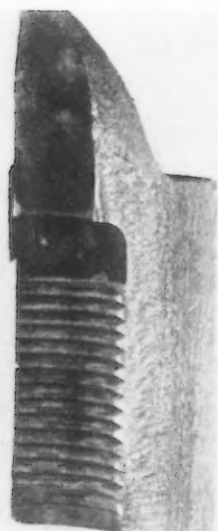


Fig. 1.—Graphite in hardened carbon tool steel. A correct total carbon chemical analysis is not an index of quality. Fracture (left) shows streaks of graphite.

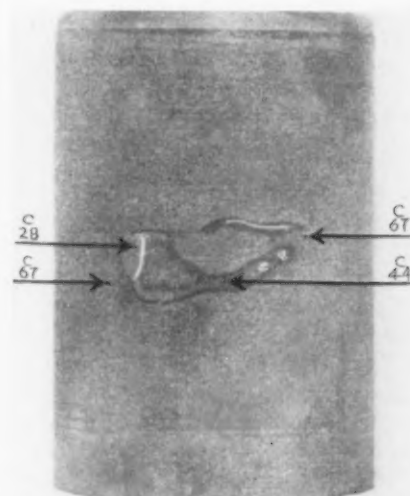


Fig. 2.—Soft spots on a cylinder of hardened tool steel.

IN "PERSONALITY" OR "TIMBRE"

CERTAIN steels having the same type of analysis differ in their "personality" or "timbre," which is revealed in variations in their performance as tools. This article, based on an address before the New York chapter of the American Society for Steel Treating, reveals certain tests to determine this quality. Timbre, according to the author, should be a leading criterion in the selection of tool steels.

Fig. 2 shows a hardened tool steel part which has been etched after hardening. A large number of soft spots are observed on the surface, indicating improper hardening. It is necessary to check uniformity of hardening by means of additional inspection of this character, if highest quality is to be maintained.

Small soft spots on the surface indicate a structural condition often much more serious than ordinarily supposed. Fig. 3 shows cross-sections through several parts having surface soft spots. The total depth of hardening in several locations is greater than it is possible to obtain by a normal hardening operation and indicates a hardening abnormality. This can be explained only by internal cooling stresses causing a pressure hysteresis which, in turn, accelerates or retards the formation of martensite.

Strains produced by such a structural condition are, of course, very much more severe than those produced in a normal hardening operation and render the part unsuitable for service. Great care must be exercised in the production of high quality work to insure all parts having 100 per cent the desired structural condition. What is often called

satisfactory quenching apparatus is not capable of reproducing the required quenching conditions.

Fig. 4 shows two parts made from the same bar of steel and quenched from the same temperature. They were then cut in two with a thin emery wheel and etched to show the distribution of hardening. Part 1 was quenched in an open brine flush, ordinarily considered improved hardening practice. Examination shows that the depth of hardening tapers off on one side to practically nothing. This condition makes the part unsuitable for its intended use, even though it does not show a soft spot on the surface. Part 2 was quenched with what is known as a conforming fixture. The brine was directed to all surfaces and a uniformly hardened product has resulted.

Timbre and Design

Timbre has been reported by other investigators as having an effect upon the service life. The necessity for the control of timbre is also accentuated by design. It is desirable on certain parts to have deep hardness in a certain location while the sections in other parts will not per-

mit the maximum hardness to be obtained. A compromise, therefore, must result and the hardening is governed according to the old rule of "quench according to the thinnest section."

Fig. 5 shows a part which has been hardened, cut in two and etched to show the distribution of hardness. The production of high-quality parts of this character necessitates control of timbre to obtain maximum service life.

Steel, therefore, cannot be purchased indiscriminately with chemical composition and cleanness as a sole specification. The writer has described in a previous paper a test for the determination of hardenability which has since been amplified to include the width of quenching range by varying the quenching temperature over a wider range. Briefly, the test consists of quenching disks of steel which have been step-ground in 1/32 in. steps. These disks are quenched in a special brine spray (still brine also being satisfactory) and broken for fracture or cut in two and etched. For any temperature, the hardenability number is taken as the numerator of the fractional thickness in thirty-seconds of an inch of the thinnest section to have a core after this operation.

Three Steels Compared

A comparison was made to determine the difference in timbre between the products of three different manufacturers, the steel being a 1.00 to 1.10 per cent carbon tool steel.

The results are shown in Figs. 6, 7 and 8 and are to a certain extent self-explanatory. The disks shown are duplicate disks and not halves of the same disk. They show a very good check upon the hardening method and response of the steel to this operation. Previous experience with steels H1 and R1 enabled the tests

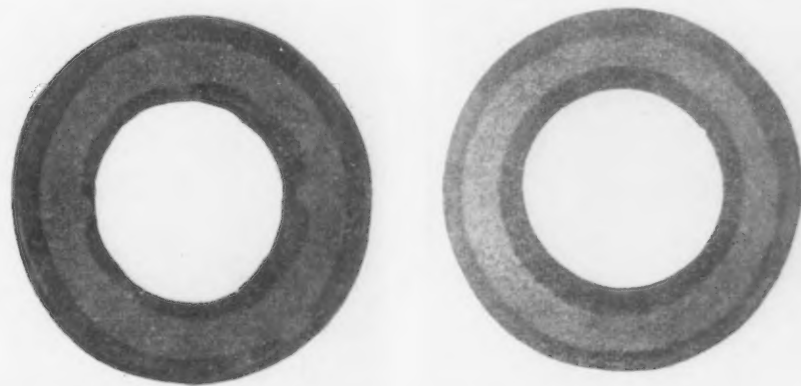


Fig. 3.—Cross-section through cylinder showing hardening hysteresis. Unsatisfactory case (left) shows hardening hysteresis. Satisfactory uniform case (right) inside and outside.

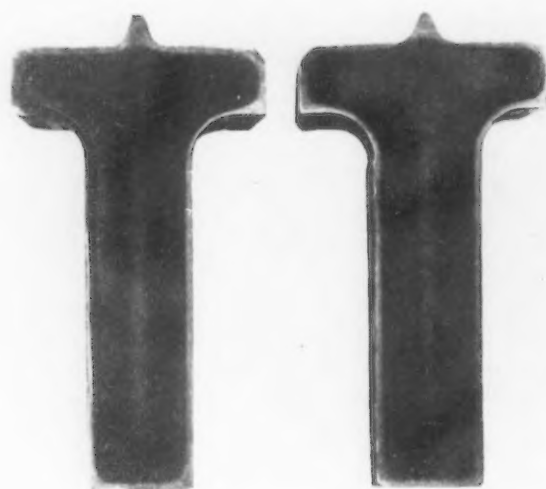


Fig. 4.—Two parts made from same bar of steel. Part 1 (left) quenched from 1440 deg. F. in brine using flush fixture. Part 2 (right) quenched from 1440 deg. F. in brine using conforming fixture.

to be made on the 10/32 in., 11/32 in. and 12/32 in. sections. On steel F1, also observed at our plant, it was necessary to use six ranges of thicknesses, as its timbre characteristics were unknown. On the 1600 deg. F. quench only three thicknesses were used.

On steels R1 and F1 the hardenability is not changed until 1550 deg. F. is reached. At this temperature the hardenability is increased from 11 to 12, and a further increase of 50 deg. increases the hardenability to 13. Samples of each of these steels quenched from 1550 deg. F., and 1600 deg. F. show slight harden-

ing cracks and a tendency to check in grinding; the 1600-deg. F. temperature showing these to a greater ex-

tent. The fracture of each of these steels shows no appreciable coarsening from the higher temperatures, although the specimens are hardened through and have a "drier" appearance than the others.

Steel F1 has poor timbre. The hardenability changes rapidly with increase in hardening temperature. The fracture starts to coarsen badly at 1500 deg. F., and at 1600 deg. F. is quite crystalline. This steel cracked badly in hardening at 1500 deg. F. and over, and is especially prone to grinding cracks.

Disks of each of these three steels approximately 1/2 in. thick were carburized at 1725 deg. F. after being heated through, and allowed to cool in the pot (8 in. x 8 in. x 6 in.). A sector taken from each disk was examined metallographically along a longitudinal radial section. There



Fig. 5.—Uniform distribution of hardness in a tool part attained by specialized hardening methods on steel of proper timbre.

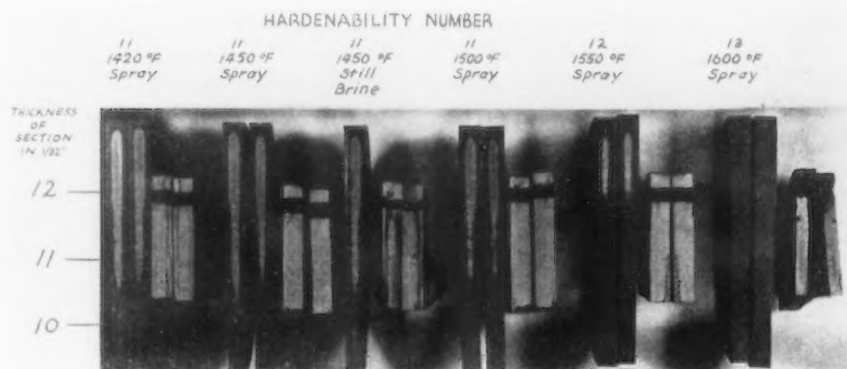


Fig. 6.—Determining the hardenability number of a steel designated as H1 having a composition —C 1.02, Mn 0.23, P 0.014, S 0.011, Si 0.24, Cr 0.03 and Ni 0.05 per cent.

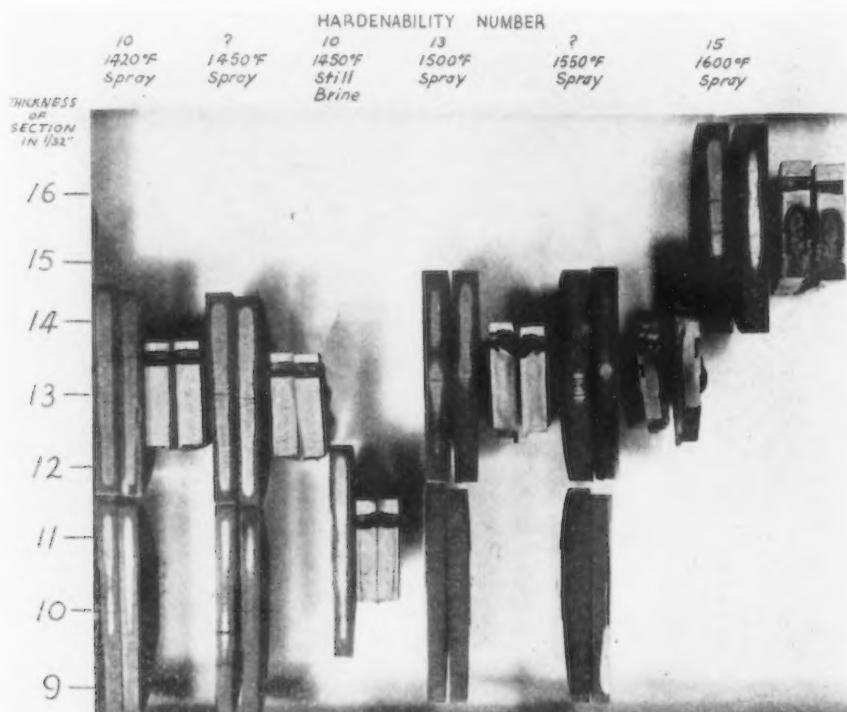


Fig. 7.—Hardenability determination of steel F1 of composition—C 1.00, Mn 0.25, P 0.013, S 0.019, Si 0.14 per cent.

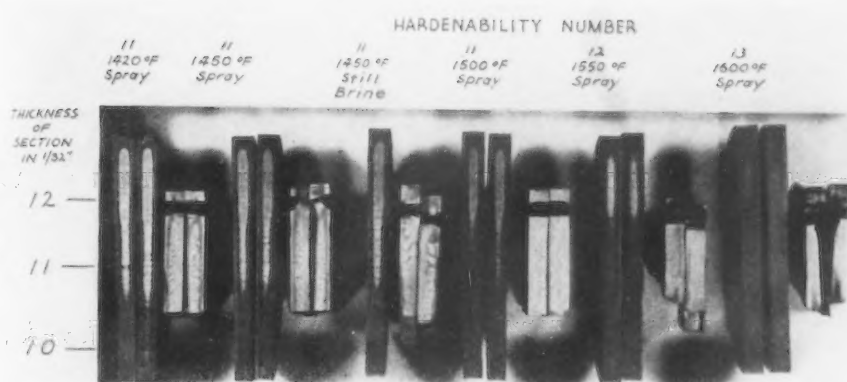


Fig. 8.—Hardenability of steel R1 of following composition—C 1.08, Mn 0.27, P 0.016, S 0.011, Si 0.22, Cr 0.05 and Ni 0.09 per cent.

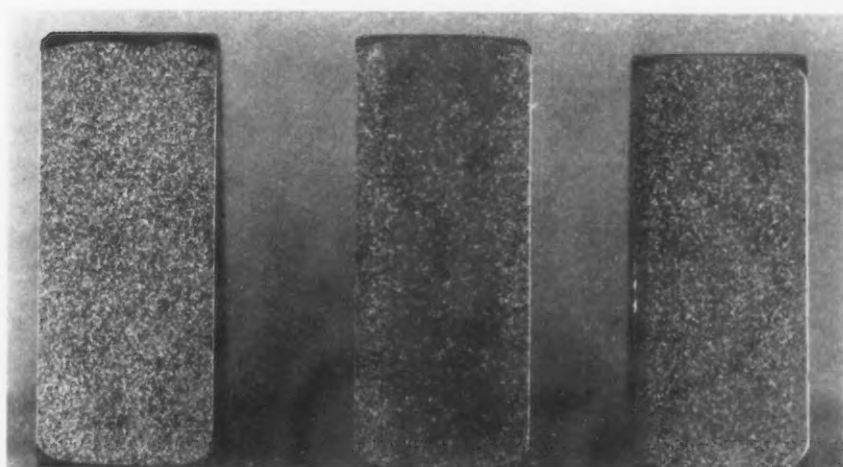


Fig. 9.—Macrographs reveal marked difference in response of the three steels R1, F1 and H1 (left to right) to carburizing operation.

was a marked difference in the response of these three steels to the carburizing operation as shown by macrograph, Fig. 9. The metallographic examination showed a still greater difference.

Normal and Abnormal Steels

The indications from comparisons by means of the McQuaid Ehn test are that normal steel has poor timbre and that good timbre steels are not necessarily distinctly abnormal steels. I think it is the aim, however, of manufacturers desiring good timbre definitely to try to make an abnormal steel.

There are still other differences between steels of equal timbre characteristics. Extensive experience has shown that steel from manufacturer "H" would, after hardening and etching, show a more distinct border line between the case and the core than steel from manufacturer "R." This difference is illustrated in Fig. 10, which shows the 12/32-in. sections (magnified four times) of the hardenability test disks quenched from

1450 deg. F., shown previously in Figs. 6 and 8. The characteristic difference in border line condition is very marked.

The difference between these two steels was previously shown to exist in the cores of the samples cooled slowly from the carburizing temperature, where steel "H" had grains which were entirely lamellar or abnormal, and steel "R" had both sorbitic and lamellar pearlitic grains. We attribute this condition to a difference in the critical cooling rate of the individual grains.

A larger dendritic structure in one steel with corresponding, though very slight, structural heterogeneity, carries on through into the finished bar, resulting in many cases in a distinctly fibrous structure. The slight difference in chemical composition of such fibers results in a difference in critical cooling rate, which also accentuates the condition shown in steel "R," Fig. 10.

Summary

I have endeavored to call attention to a difference in quality of ma-

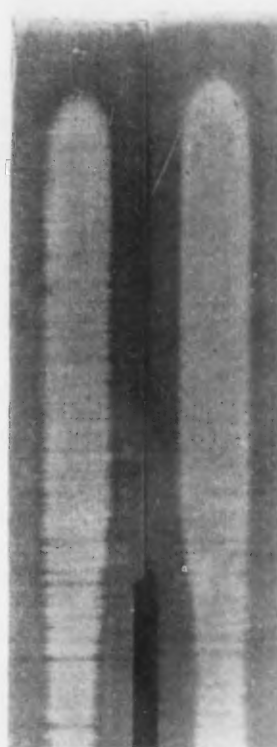


Fig. 10.—Characteristic differences in border line between case and core of two steels R1 and H1 (left to right) after hardening.

terials which is not usually ascertained until trouble develops in fabrication or in the field. The development of tests to determine timbre in alloy steels is very much to be desired. The use of such a test on tool steel and the purchase of tool steel with timbre as one of the main criteria of selection will result in an improved product, a culling out of undesirable sources of supply and a better understanding of this peculiar quality of steel.

The North Central Experiment Station of the Bureau of Mines, in cooperation with the University of Minnesota, has investigated the reducibility of iron silicate to determine the influence which this constituent of sinter has upon deoxidation. Particles of an iron silicate slag, ranging in size from minus 3 to plus 14 mesh, were only about 35 per cent reduced when exposed to carbon monoxide gas for 16 to 22 hr. at 950 deg. C. Under the same conditions such particles of several iron ores investigated were completely reduced in one hour. When minus 80 mesh particles of iron silicate slag were exposed to carbon monoxide for 17 hr. at 950 deg. C., 99 per cent of the iron was present in the metallic form.

MAKES CONDUIT BY CONTINUOUS

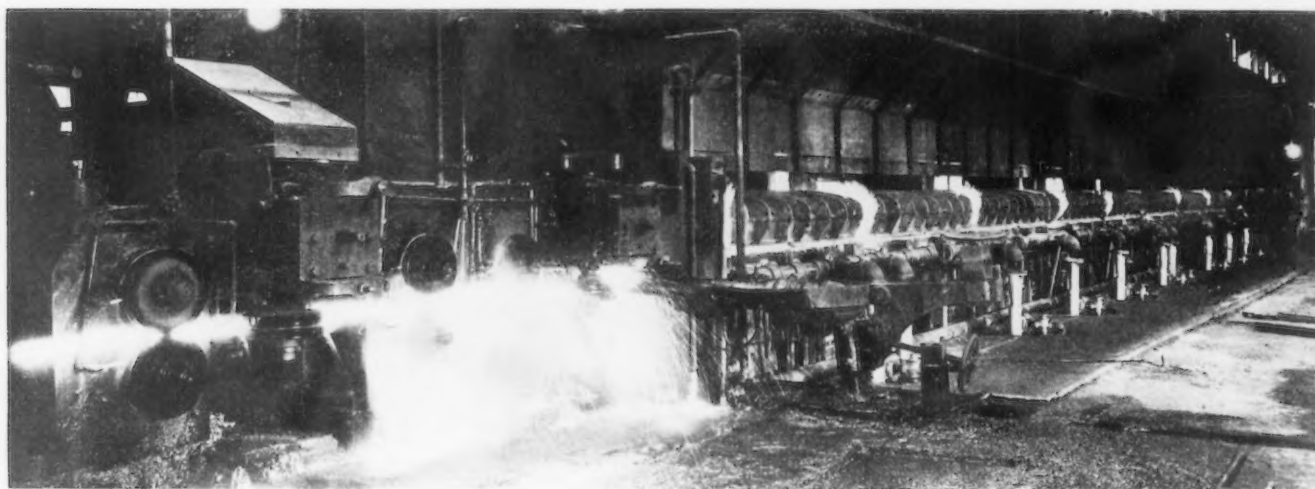
A CONTINUOUS process of manufacturing conduit features a plant of notably modern appointments recently completed at Butler, Pa., by the Fretz-Moon Tube Co. The conduit is a welded pipe made from skelp, used chiefly of course for the protection of electric wiring. The continuous method calls for the use of skelp received in coils and the welding of the lengths of the uncoiled skelp into a continuous strip, which is brought to the welding temperature in specially designed gas-fired

furnaces. Besides the interesting gas furnaces, particularly noteworthy are the galvanizing arrangements and the equipment for enameling the conduit. Much of the information has been obtained from J. B. Nealey, of the American Gas Association.

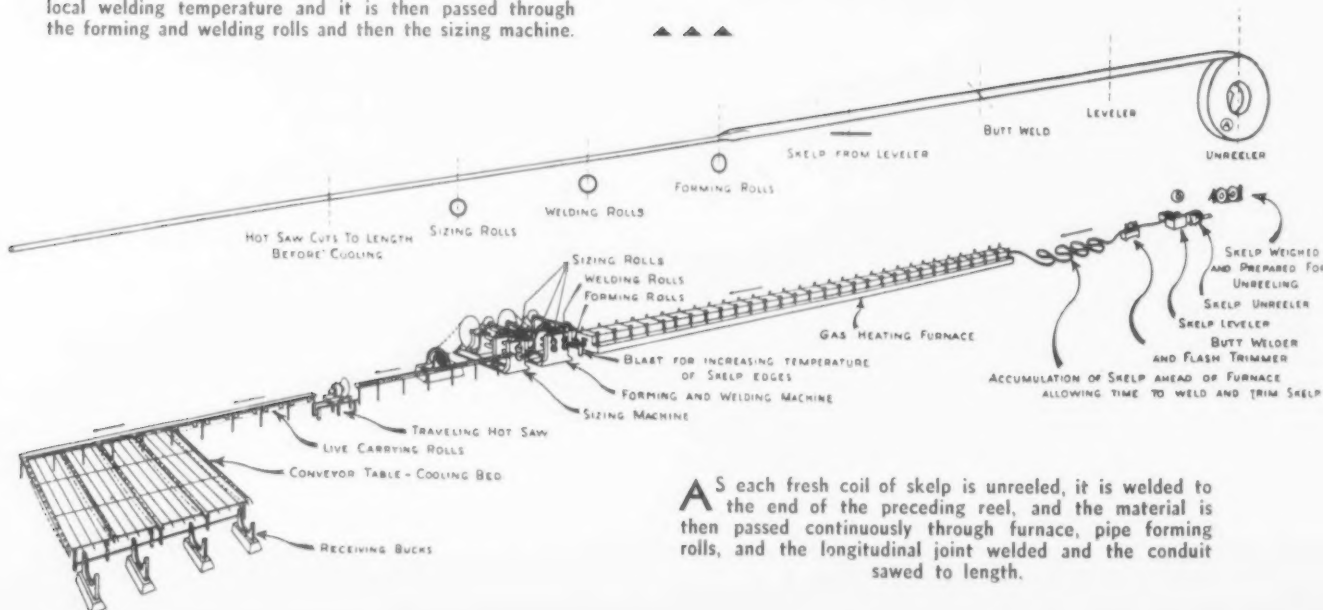
The skelp comes in coils ranging from 300 to 1500 ft. in length and one coil is welded to the next, as stated. Conduit of $\frac{1}{8}$ to $2\frac{1}{2}$ in. in diameter is made and the skelp ranges from $1\frac{9}{32}$ to $9\frac{1}{4}$ in. in width and 0.065 to 0.154 in. in thickness. The accom-

panying diagram gives an idea of the general scheme and, in the lower part, the character of the apparatus for every step in the conduit making process. To accommodate the periodic pause for butt welding of the lengths of skelp, and trimming any resulting flash of the welds, provision is made for a looping of the skelp, as indicated, on a special runway, all to the end that the conduit forming operation may go on without interruption.

The seam welding furnace, that the skelp now passes through, is especial-



ON issuing from the long small-cross-section heating furnace, the skelp receives a jet of air to bring about a local welding temperature and it is then passed through the forming and welding rolls and then the sizing machine.



AS each fresh coil of skelp is unreeled, it is welded to the end of the preceding reel, and the material is then passed continuously through furnace, pipe forming rolls, and the longitudinal joint welded and the conduit sawed to length.

US GAS-WELDING PROCESS ▲ ▲ ▲

ly small in cross section, and designed to secure effective heat transfer for its special purpose. The principal thought in the design was to concentrate the heat on the edges of the skelp, as the body of the skelp needs a bending temperature only, and this was accomplished by placing a long row of gas burners in each side of the furnace so that they would fire against the edges of the skelp as it passed through. The speed at which the skelp moves runs from 150 to 225 ft. per min. depending upon its weight.

Unusual Heating Furnace

This furnace is of brick and steel construction, 125 ft. long, 4 ft. wide and 5 ft. high. The hot skelp is pulled along over a series of water cooled skids, to prevent picking up foreign substances, such as slag and scale. As concentration of the heat application was the most important factor, the heating chamber proper is only 11 in. wide and 14 in. high, and the burners fire through bell-mouthed refractory tunnels so that the heat transfer is through convection, radiation and flame impingement. These tunnels as well as the lining of the furnace are constructed of Silimanite to withstand a temperature of 3,300 deg. F. The burner tunnels are designed to secure complete combustion with a minimum of air dilution and

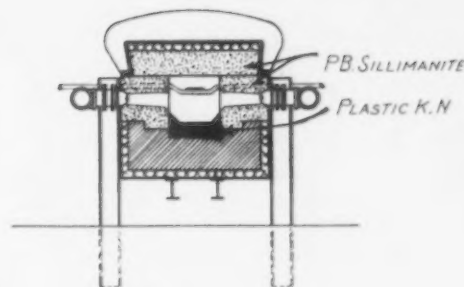
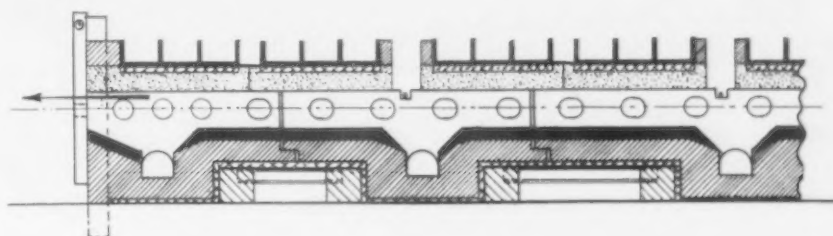
thus a close approach to theoretical flame temperature.

There are 80 of these burners, 40 to a side and these are grouped by manifolds, four to an inspirator set of the low-pressure type. Of course, the function of the inspirators is to maintain constantly and automatically the desired and predetermined ratio of gas and air and to intimately mix the two. The rate of combustion is 1000 cu. ft. of gas an hour in a single cubic foot of combustion chamber space, which is exceptionally high. The total capacity of the burners is about 70,000 cu. ft. of gas an hour. Air for combustion is delivered to the inspirators by a 1500-lb. turbo compressor with a capacity of 9,000 cu. ft. a min. at 24 oz. pressure. The gas supply from the mains is reduced to zero pressure by two sensitive regula-

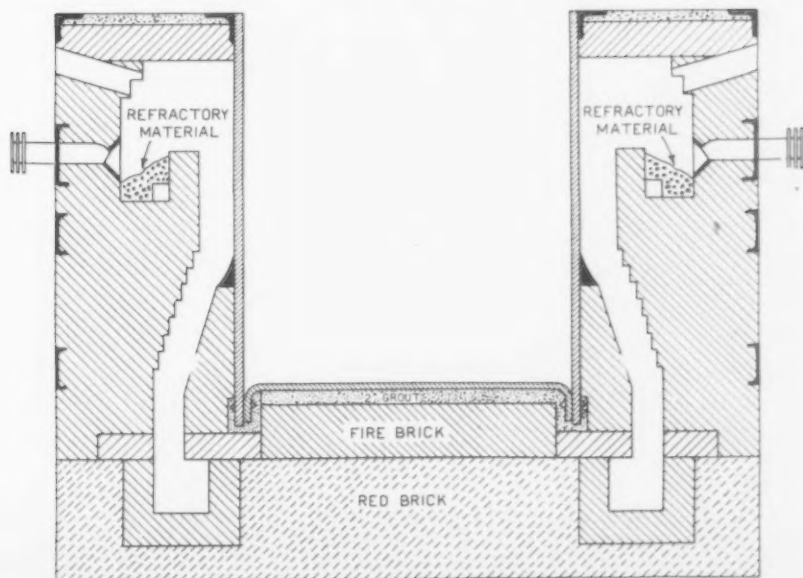
tors, one for each side of the furnace.

The production rate is a direct factor of the furnace temperature, in this particular application, and amounts to 10 tons of 1½ in. conduit hourly with a consumption of only 3700 cu. ft. of gas per ton of work.

Another feature is the method by which the edges of the skelp are stepped up to full welding temperature outside of the furnace. As the strip steel emerges from the furnace it passes through forming rolls which give it the circular shape of pipe with the edges in close contact. They require just a little more heat for welding and this is obtained by playing a jet of air on the hot edges. The reaction of the oxygen of the air and the carbon of the steel brings the temperature from 2500 to 2600 deg. up to around 2800 deg. F., and the



THE skelp is pulled over a series of water-cooled skids in its passage through the long 11 x 14-in. heating chamber, on opposite sides of which are 40 gas burners, 80 in all.



THE gas burners for heating the bath of the galvanizing furnace have a top position. There are 18 burners on each side for the 24 ft. of length. The products of combustion impinge on refractory materials in each case, as indicated.

skelp passes directly into a set of rolls which press the edges together into a welded seam. The pipe then passes through several sets of sizing rolls which true it up to its final shape and diameter. It is then cut up into lengths by a high speed rotary saw, mounted on a traveling carriage, which moves along at the same speed as the conduit while it is sawing through, then returning for the next cut.

The lengths, after being cooled, are passed through straightening rolls, tested under hydrostatic pressure and accumulated in a cradle from which

cold metal is introduced at the top, that the cold work enters at the top, that quantities of cold air are always in contact with the top surface of the liquid metal and that much heat is ordinarily lost through black body radiation from this surface. The conclusion was that the heat was needed most in the upper part rather than at the bottom, so the burners are set about a foot and a half below the top.

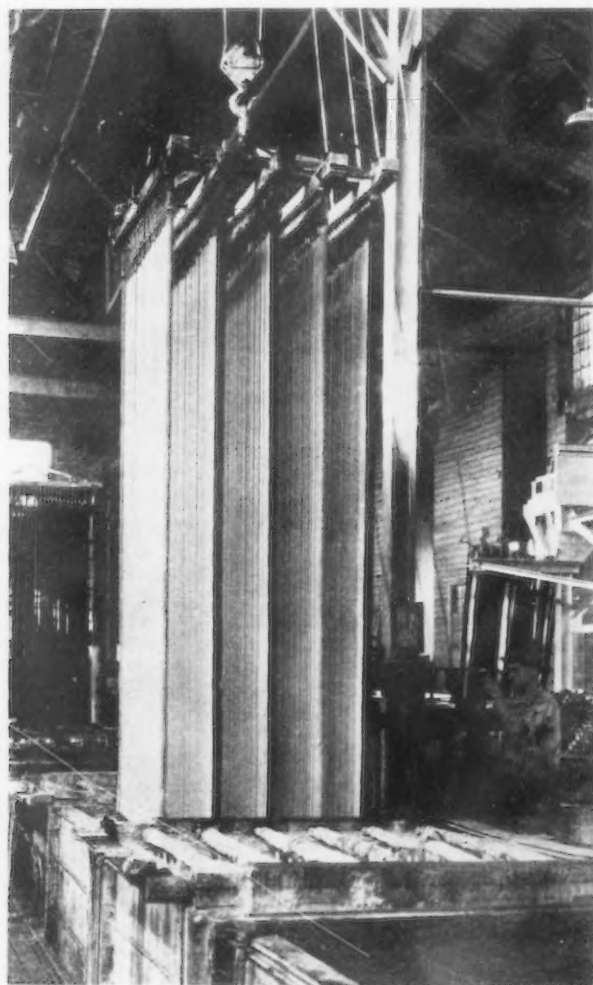
Galvanizing Tank Heated at Top

This galvanizing tank is 4 ft. wide, 4½ ft. deep and 24 ft. long. It sets

in a brick furnace, which in turn rests in a pit in the floor, so that the pipe can be handled in and out with relative ease. The furnace walls, including refractories and insulation, are about two feet in thickness. Heat is supplied through 36 gas burners, 18 on each side and in a single row. These are high pressure impact burners, utilizing gas at 20 lb. pressure, and procure primary air for combustion through inspirators. These burners are cemented in the outer furnace wall, and just in front of each is a small chamber, built directly into the wall, in the bottom of which is a bed of refractory material as is shown in an accompanying drawing.

The gas burners fire directly upon these refractory beds and maintain them at incandescence. The hot products of combustion are drawn over a low bridge wall and down the sides and bottom of the kettle to a common duct, running the entire length of the tank, to a stack. The radiation from the refractory beds serves to promote complete combustion in short space and quick time. While the furnace walls facing the kettle become radiant and radiate a large quantity of heat to the kettle walls, most of the heat goes into the tank through convection, due to the fact that the distance between the furnace and kettle walls was designed to provide the greatest velocity for the products of combustion passing through. This method has been found to effect material savings in fuel, labor and dross accumulation.

(Concluded on advertising page 18)



▲ ▲ ▲
IN the electrogalvanizing process the pipes are suspended from racks, which are handled by overhead cranes and hoists.

THE operator picks up one end of each pipe as it emerges from the hot galvanizing bath, touches it to two motor-driven magnetic rolls, and the rolls pull the pipe out of the tank and through a ring of steam for blowing off surplus zinc.



they are picked up by crane and removed to the finishing division. Here the pipe is given one of three finishes, hot galvanizing, black enameling or electrogalvanizing. In all three treatments the inside is always finished in black enamel. The matter of hot galvanizing, a new manner of heating the galvanizing tank or kettle has been introduced.

Instead of heating the galvanizing tank from the bottom, the designers took into consideration that all of the

Cemented-Carbide Tools Reduce Cost of Machining Aluminum Parts

SHORTLY after the introduction of cemented-carbide tools it was found that the difficulties formerly encountered in the machining of aluminum due to excessive tool wear were largely eliminated because of the greatly increased life of these tools, even under severe cutting conditions. This new order of cutting performance quickly brought about the release of new, tougher and lighter alloys in the aluminum field so that now aluminum alloys which a short time ago were commercially non-machineable are in common use.

The aircraft industry has naturally benefited by this trend, as a large part of its production involves the fabrication of aluminum parts. In this industry, machining work must be done with accuracy, with close tolerances prevailing, yet manufacturing costs must be kept at a minimum. It is not always possible to achieve these two results; in the past, low production costs have often been sacrificed for accuracy. An application recently completed at the Govro-Nelson Co., Detroit, manufacturer of aircraft parts, indicates the economy which is now possible with cemented-carbide tools in machining aluminum alloys.

A large portion of the metal machined in this shop is a special heat-treated aluminum alloy, a material that quickly wore down the cutting edges of the tools previously employed and made it difficult and expensive in most cases to maintain close tolerances. The tools were found to have a short life between grinds and would not stand up for economical periods of operation. Often the down time on a job was greater than the operating time.

Markedly improved performance has been secured through use of cemented-carbide tools. In machining cylinder heads, for example, three sets of Carboloy cemented-carbide tools are now employed. The first rough bores three diameters (4 7/16, 4 5/16 and 4 1/2 in.) and rough forms a 2 5/16-in. spherical radius, the second finish bores the above three diameters and finish forms a 1/2-in. radius, and the third finish forms the true spherical radius.

Tolerances on the finishing operations are close. On the second operation, two of the diameters must be held to plus or minus 0.005 in. In finish forming the true spherical radius, plus or minus 0.002 in. is the limit. Speeds on this work range from 82 to 263 r.p.m., as against former maximum speeds of 25 to 75

r.p.m. As to the number of pieces produced between grinds, the cutting tools previously used lasted for from 10 to 25 pieces, whereas with cemented-carbide tools the entire run of 300 pieces is machined without interruption for grinding.

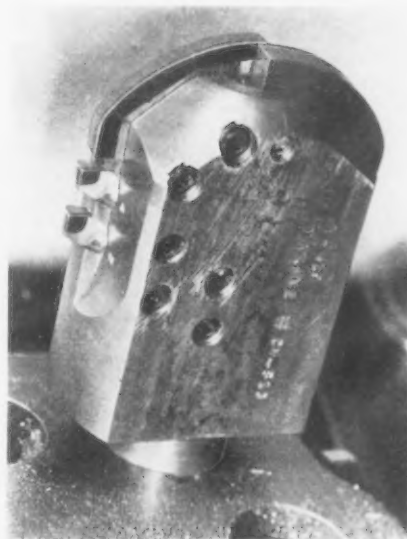
It is interesting to note that cemented-carbide tools have effected a saving of 50 per cent in production time. The floor-to-floor time is now 14 min., including several operations in which carbide tools are not employed. It is estimated that a saving of 50 per cent in scrap has been made by using this aluminum alloy.

Another application in the Govro-Nelson shop is the reaming of the seven-cylinder radial aircraft crankcase made of an aluminum alloy. Fourteen tappet holes are reamed with an expanding reamer of the company's own design, which machines 1000 pieces between grinds. The operating speed has been increased from 250 to 800 r.p.m. The result is a saving of 1 hr. per piece in actual operating time and a gain of 20 hr. a week in productive capacity of the machine tool.

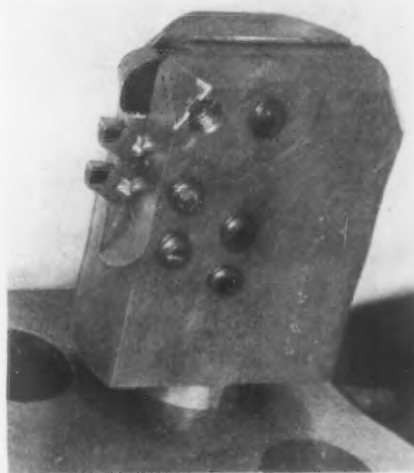
Cemented-carbide tools likewise have shown a favorable performance on the turning and facing of aluminum alloy pistons. They have increased production from 125 to 225 pistons per day, the speed from 185 to 425 ft. per min. and the number of pieces between grinds from 50 to 1000.

American Institute of Steel Construction, Inc., 200 Madison Avenue, New York, will soon conduct its annual bridge award for the outstanding steel bridges completed in 1931. Awards will be made for three classes of structures, namely: Class A, for structures costing more than \$1,000,000; Class B, between \$250,000 and \$1,000,000; Class C, less than \$250,000. The jury of awards will meet on June 8 to consider all entries, which close on May 31.

Ten students out of 111 contestants have been selected to compete for the annual award offered by the American Institute of Steel Construction for the most beautiful steel bridge design. A jury of nationally-known architects and engineers have selected the 10 best and asked the students to submit finished drawings to the institute not later than May 2.



Cemented-carbide tool set-up for rough boring three diameters and forming spherical radius.



Set-up used to finish bore and form a half-inch radius.



One of cylinder heads on which cemented-carbide tools saved 14 min. per piece.

OTIS COMPLETES 72-IN. CONTINUOUS S

A 72-IN. continuous sheet mill with a capacity of approximately 50,000 tons per month was put in operation recently by the Otis Steel Co., Cleveland. This mill is designed for producing sheets from 24 to 65 in. in width and from No. 16 gage to $\frac{1}{4}$ in. in thickness.

Production in the continuous mill follows a straight line from the steel plant until the finished material is coiled after the last rolling operation or delivered to a hot bed. The company expects that eventually it will be able to reduce a large portion of the material, except light-gage sheets, to its finished form without reheating after leaving the soaking pits.

Equipment for the continuous process has taken the floor space formerly occupied by a sheet bar mill in a blooming and sheet bar mill building. To provide additional room required for the new mill a 220-ft. extension was built, providing a building 680 ft. long and 240 ft. wide. The warehouse on one side was extended to the same length and a 400-ft. extension was added to the motor house on the opposite side. A depressed track was laid in the warehouse in which outgoing shipments are now loaded on cars with an overhead crane.

Steel made in eight 150-ton oil-fired

open-hearth furnaces is cast into ingots in sizes from 22 x 24 in. up to 24 x 48 in. These are heated in 13 soaking pits of various types and sizes, fired by coke oven gas and fuel oil. Then they are reduced on a 40-in. blooming mill to slabs from 3 to 6 in. thick, depending on the size of sheets to be rolled, and in lengths up to 11 ft.

Double Pusher in Reheating Furnace

The slabs on leaving the blooming mill, if not reheated, move on tables in a straight line through a shear for cutting off the crop ends and cutting to short lengths and on to the first mill stand. Two continuous reheating furnaces and a transfer table are located between the crop end shear and first mill stand. Slabs that are to be reheated are pushed by a mechanical pusher off the table leading to the mill and on to a transfer table which is in an inclined position and carries the steel up to a level with the charging end of the furnace. Here the slabs pass to a roller table that feeds the furnace or go to a stock pile.

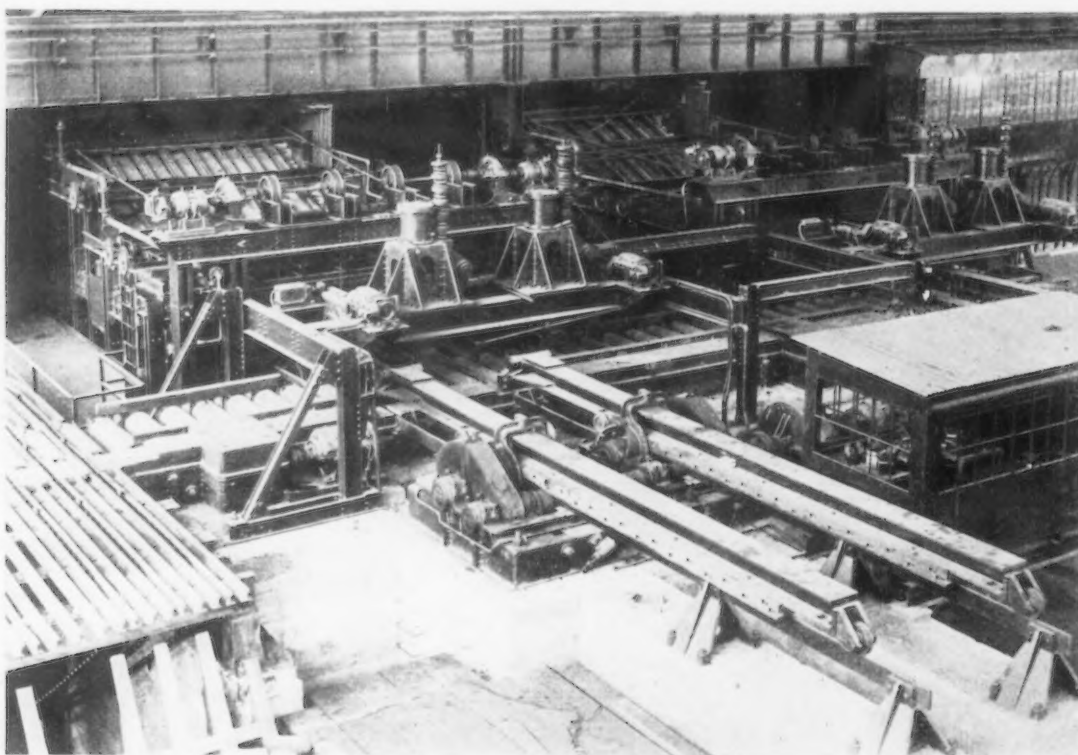
The continuous reheating furnaces are of the triple-fired recuperative type. They are oil-fired through 16 burners, five projecting above the roof to heat the slabs from above, five beneath to heat the under side of

the slabs and six near the discharge end to maintain the soaking temperature. The hearths are 14 ft. wide and 57 ft. long and will accommodate slabs up to 11 ft. long. A feature designed to provide flexibility is the division of the pusher of each furnace into two sections. These may be used independently for short slabs or the two may be hooked together for charging long slabs. The furnaces each have a capacity of 50 tons of hot steel or 30 tons of cold steel per hour.

Slabs Cross-Rolled for Greater Widths

Slabs are discharged from the skid pipes of the furnace to the mill approach table. A skew table is located in front of the first mill stand for turning slabs sideways for cross-rolling when a greater width is required for wide sheets than the blooming mill will produce. The maximum width rolled on the blooming mill is 45 in. For sheets in widths from 45 to 65 in. the slab is cross-rolled.

The mill consists of six roughing stands and four finishing stands. The first four roughing stands are two-high mills with rolls 32 in. in diameter. All mill rolls are 72 in. long. Stand No. 1 is a scale breaker, but makes some reduction. The fifth



LOADING end of the two reheating furnaces. Slabs to be reheated before going to the continuous sheet mill are transferred from the crop shear runout table to an inclined transfer table, the discharge end of which is shown at the extreme left. This table takes them to the loading end of the furnaces. Slabs that are not reheated continue their straight course past the discharge end of the furnaces.

US SHEET MILL

By F. L. PRENTISS

Cleveland Editor, THE IRON AGE

roughing stand is a three-high stand formerly used in the plant, which will be operated as a two-high mill. This has a 22-in. diameter middle roll and 30-in. diameter top and bottom rolls. Stand No. 6 is a four-high stand with 20½-in. diameter working rolls and 45-in. diameter backing up rolls. Vertical edging rolls are located in front of stands Nos. 2, 3, 4 and 5.

The distance between the roughing stands ranges from 27 ft. 6 in. to 42 ft. 9 in., the mills being a sufficient distance apart so that the sheet will not be passing through two stands at one time. The distance between the last roughing stand and first finishing stand is 82 ft. 3 in., these two stands being a sufficient distance apart to allow the steel to leave the last roughing stand before entering the first finishing stand.

Four Finishing Stands

The four finishing stands are four-high mills that are duplicates of the last roughing stand. The finishing

stands are on 21-ft. centers. Between these stands are air operated loopers which are controlled from the pulpit by the operator who controls the mill speeds. All the mills have motor-operated screwdowns and side guides.

Water for removing scale is supplied at 1000-lb. pressure by two hydraulic pumps, each with a capacity of 1000 gal. per min. The water supply is controlled by quick-opening spray valves. This spray is supplied on the roughing stands and at two points between the last roughing and first finishing stand. The spray is cut off when rolling light gages.

The first five roughing stands are driven by induction motors through gear reducers, No. 1 by an 800-hp., No. 2 by a 1200-hp., No. 3 by a 1600-hp., No. 4 by a 2000-hp. and No. 5 by a 3000-hp. motor. The sixth stand is driven by an 11,000 volt, 2500-hp. synchronous motor. The first two roughing stands are driven at a speed of 16 r.p.m., the third at 21, the fourth at 28, the fifth at 34 and the sixth

A CONTINUOUS sheet mill recently put into operation by the Otis Steel Co., Cleveland, has a capacity of 50,000 tons monthly and will make sheets from 24 to 65 in. wide and from No. 16 gage to ¼ in. thick. Production follows a straight line from the steel plant and the company expects to roll a large proportion of the sheets without reheating the metal after it leaves the soaking pits.

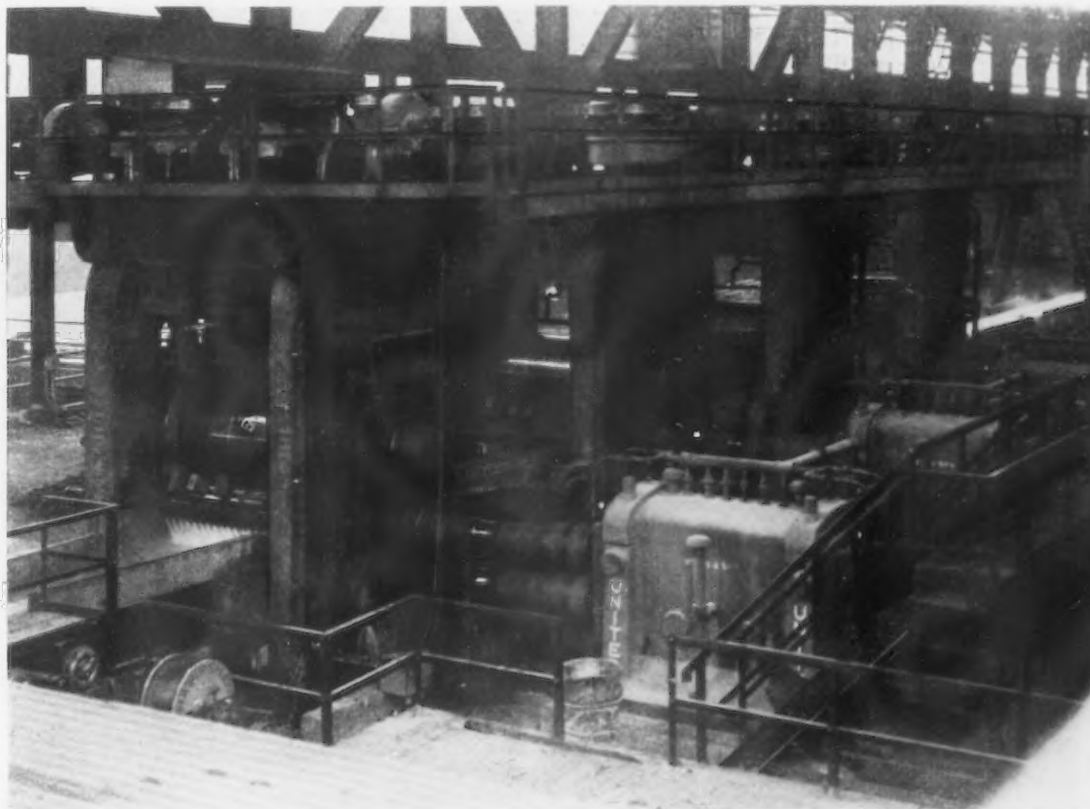
at 61 r.p.m. The edging rolls are driven by 150-hp. motors.

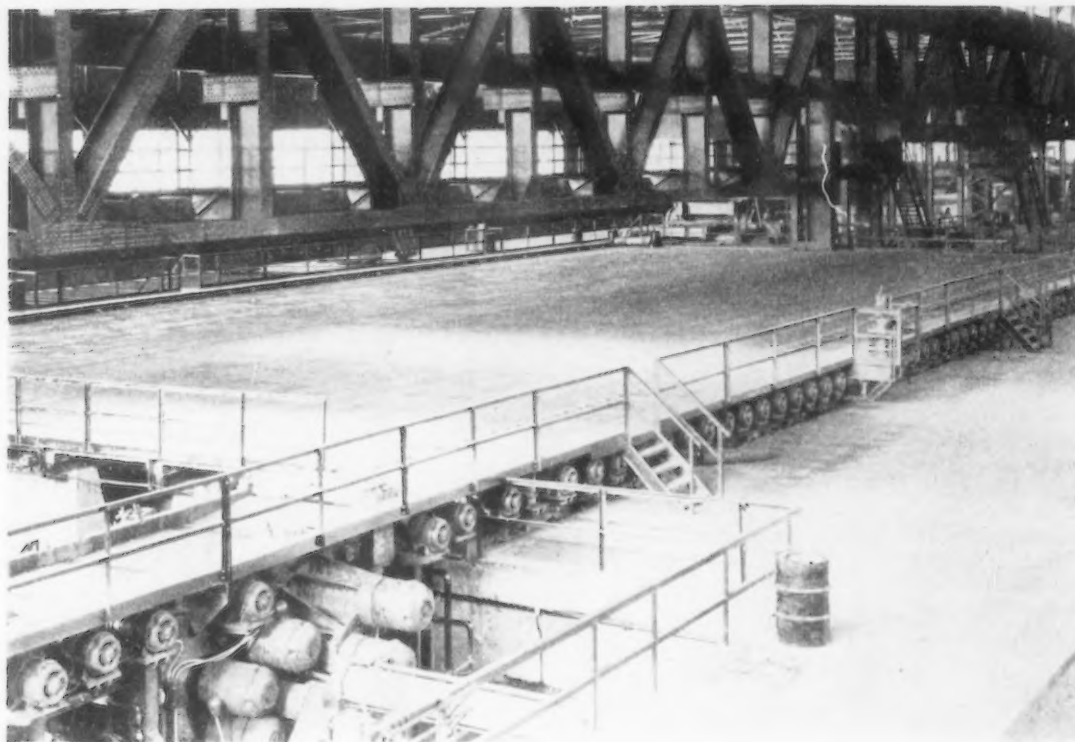
The four finishing stands are driven by 600-volt d.c. variable-speed motors with a speed range of 175 to 350 r.p.m. The first three are 3500-hp. motors and the fourth is a 2500-hp. motor. Current for the finishing mill motors is supplied by two 4000-kw. motor-generator sets.

Hot Run-out Rollers Have Group Motor Drive

Leaving the finishing stand the sheet moves over a hot run-out table and is either delivered to coilers at

The four 4-high finishing stands.





THE hot bed — at the right the hot bed run-out and in the foreground one of the coilers. Most of the steel that is to be shipped flat is run back on the cold run-out (on the opposite side of the hot bed) to the flying shear shown at the end of the hot bed. At the side of the hot and cold run-outs are some of the hand-operated lubricating pumps.

the end of this table or is pushed off on to a hot bed at the side of the table. Sheets that go to the hot bed are delivered to a cold run-out table on the opposite side of this bed and are carried back to a flying shear near the mill end of the hot bed, where they are cut to length and piled. Then they are ready for shipment. However, a gate-type shear is located at the lower end of the cold run-out table for shearing lengths that are longer than can be cut by the flying shear.

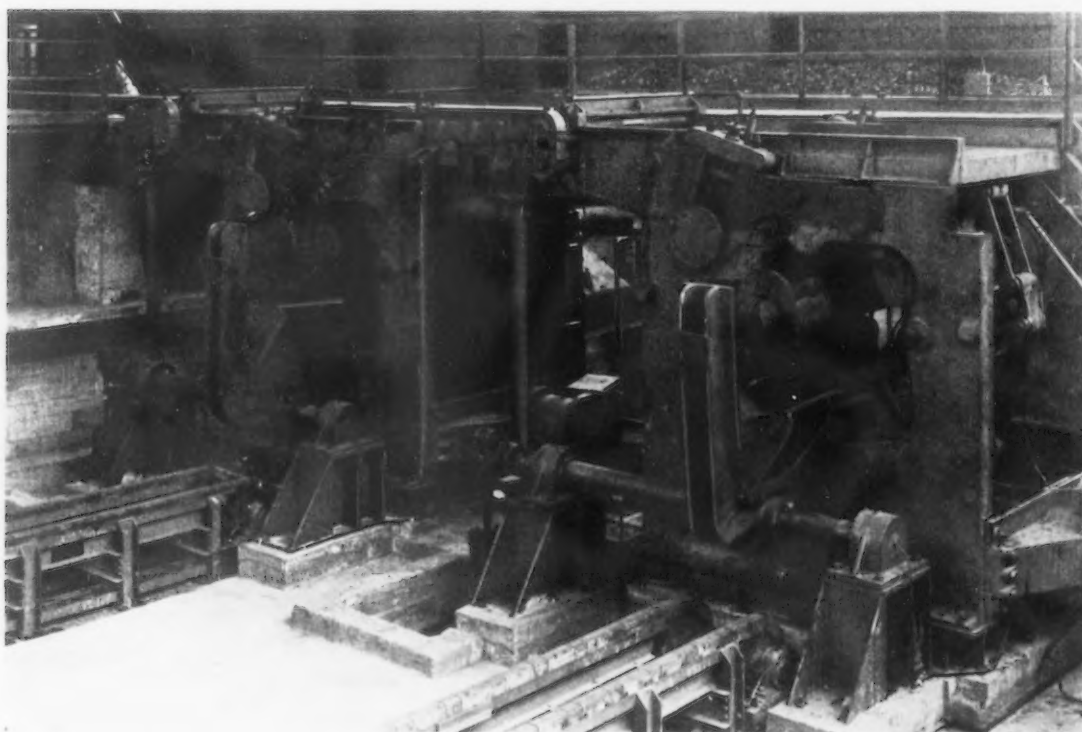
The mechanical hot bed is 160 ft. long and 70 ft. wide between the cen-

ter lines of the hot and cold run-out tables. The hot run-out table has a speed of 600 to 1200-ft. per min., which is the speed range of sheets leaving the last finishing stand. The coilers are also designed for handling sheets at the same speed range.

The hot run-out table has 80 10-in. diameter rollers which are individually driven by variable frequency motors in groups of 20. With this arrangement a smaller motor generator set is used than would be required were the 80 rollers started together. The motor-generator set for driving the rollers is composed of a variable-

speed motor and two alternating-current generators, the latter supplying alternating current for the motors on the rollers. The speed of the rollers is controlled by varying the frequency through changing the speed of the motor-generator set. The rollers are stopped very quickly by cutting off the alternating current and plugging in direct current on the three-phase motor. Each group of rolls can be started in 4 sec. and stopped in 2 sec.

The coilers, two in number, reel up the sheet into coils with 30 in. inside diameter and 42 in. outside diameter. (Concluded on advertising page 18)



THE coilers are located in a pit at the end of the hot run-out. The coils are dumped on chain conveyors which take them across the pit to the side of the adjoining warehouse, where they are handled with a crane.

Convertible Tractor Shovels Find Many Uses in Foundries

By C. E. KOHL
Crane and Shovel Engineer,
Austin Mfg. Co., Chicago



▲ ▲ ▲ This 3½-yd. shovel can be equipped with a clam shell for handling sand.

THERE was a time when the tractor shovel was used entirely for excavating work, but improvements in these machines over the past few years have greatly widened their adaptability. Many types of conversion rigs are now available that merely take advantage of the power plant, the general clutch and gear mechanism and the tractor portability of the shovel, to provide an entirely different type of tool. The developments in the field of smaller and less cumbersome tractor shovels with greater flexibility have also had a bearing on wider diversity of uses for such equipment.

In foundries many types of work are now being handled by convertible shovels. Such equipment may be working one day on the handling of scrap with a magnet, on skull cracking the next day, on digging a pit for a large casting or the loading or unloading of sand.

In about an hour's time the standard dipper and dipper boom can be removed and a crane boom with clam shell attachment can be installed for the handling of a wide variety of bulk materials. Unloading of material from cars to stock pile and the loading from stock pile to dump cars or into trucks may be done economically with this equipment.

Probably one of the most useful at-

tachments for a small tractor shovel is the crane with a telescopic boom equipped with a sheave hook block. Such a boom may be about 25 ft. long with a 10-ft. telescopic extension which provides a 35-ft. reach. Although capacities vary greatly, a 3½-yd. shovel when converted into a crane will handle loads of approximately 3000 lb. at a radius of 15 ft. Where the boom is almost vertical and the entire machine is moved with the tractors, the load can be increased somewhat beyond that limit. Boiler setting work or work around the cupolas is often handled in this way.

The scope of the tractor crane is illustrated in the renewing of the wheels of an overhead crane. Ordinarily the crane must be blocked up on its track, a rather awkward job due to its height from the floor and the limited working area of the I-beam track. In some plants the tractor crane is brought in and with the boom in a vertical position a sling is thrown around one end of the overhead crane. That end of the crane is raised sufficiently to permit changing the wheels and the operation is repeated at the other end.

Aside from general construction operations the drag line attachment is often a very useful modification. For trimming up stock piles or for grading filled-in land the drag line handles

the work with maximum efficiency. In building up dikes, as a protection against floods or around oil tanks, the drag line can be used when a foot or two of the surrounding terrain can be utilized to provide the material for the dike. There are also many types of excavating, including trench digging, that can be done economically with the convertible shovel.

Mechanical Improvements Help Widen Range

While extension of the field of work for the convertible shovel is due in a large measure to the attachments which manufacturers have provided, mechanical improvements have also played a part. The shovel of today is a much more reliable piece of equipment than formerly. It has a greater degree of flexibility and portability, and maintenance and operating costs are much lower, due partly to the extensive use of anti-friction bearings. The reduction in friction losses on shovel equipment has brought about a definite reduction in the size of the power plant required to perform the same operations.

Then there are many other mechanical refinements, such as booster-type clutches, brakes which are readily renewable, pressure lubrication and a greater degree of accessibility. Shovels are now designed so that all of the clutches are interchangeable and of a more or less standard tractor design so that repair parts are obtainable anywhere without difficulty. Cut gearing, inclosed and running in oil, is another feature now utilized in small shovels. Increase of tractor speeds has also been given attention.

Harry Kirchmann, Allegheny Iron & Metal Co., Philadelphia, was elected president of the Philadelphia chapter, Institute of Scrap Iron and Steel, succeeding J. V. S. Bishop. Other officers include H. A. MacMullen, Henry A. Hitner's Sons Co., Philadelphia, vice-president; John Hunt, M. J. Hunt's Sons, Philadelphia, treasurer; Walter S. Gates, Charles Dreifus Co., Philadelphia, secretary.



▲ ▲ ▲ With a crane boom and tackle, the shovel may be used for skull cracking, magnet transport of scrap and general materials handling.

Putting the Question Mark to Work.

Selecting Inspectors

Should an inspector be a mechanic? C. B. N.

We have found that the chief requisite of a good inspector is power of observation rather than mechanical skill. In one large plant inspectors are selected by their ability to see at a glance a large group of miscellaneous objects spread on a table. The objects, consisting of screw drivers, nuts, ball bearings, scales and small tools, are spread out in a miscellaneous fashion on a white sheet of cardboard and the applicant for the job of inspector is allowed to study them for a minute. After this he looks away and one or two of the articles are either removed or rearranged and his ability to detect such alteration is the basis for judging his fitness as inspector. We feel that it is an advantage to have an inspector of a mechanical trend of mind but we do not place a great deal of stress on his being an expert mechanic. D. W. McN.

Life of Belts

I have a standard belt drive from a 10-hp. motor. Recently it became necessary to move the motor closer to the shaft pulley. Will this have any effect on the life of the belt? S. R. A.

So long as the belt is wide enough to transmit the rated horsepower, the arc of contact has no effect on its life. The arc of contact varies with distance between centers when pulleys are of different diameters. Of course, if, by reducing the arc of contact, you overload a belt, that is another matter. Suppose you have

THIS feature, which appeared first in the April 7 issue of THE IRON AGE, is scheduled to appear bi-weekly. Readers of THE IRON AGE are invited to submit questions or comment to the Forum Editor, Iron Age Publishing Co., 239 West 39th Street, New York. When several interesting answers to the same question are submitted the question will be repeated with each different answer in succeeding issues. The answers as presented are not always endorsed by THE IRON AGE editors.

an 8-in. belt just capable of handling your load on a 180 deg. contact and then you shorten the distance between pulleys so as to give a contact arc of only 120 deg. This naturally overloads the belt and slipping and shorter belt life are apt to result. The rating of the belt is based on 180 deg. arc of contact. Therefore if this arc of contact is reduced the width of the belt should be increased to compensate. Usually there is sufficient leeway between the actual service demand and the capacity of the belt to permit considerable shortening of the pulley centers without decreasing the life of the belt. J. C. S.

Tank Design

Is there a table for determining gage of sheets for flat tanks? Also for indicating design and nature of bracing? McG.

Although I do not now recall just where, I have seen a table of recommended gages for round tanks of water. However, I doubt that anyone has ever attempted to compile such a table for rectangular tanks, owing to the limitless combinations of sizes. D. A. H.

Effect of Nitriding

Does nitriding have any effect on core strength? R. U. I.

It may or it may not depend on the previous heat treating history of the steel. If the drawing temperature during heat treatment has been higher than the nitriding temperature, no effect on the core is noticeable. However, if the draw temperature has been low, say, as low as 900 deg. F., and we desire to nitride at 1050 deg. F., we have found there is occasionally some loss in strength of the core. Probably for other temperatures the loss in strength might be greater. A. E. W.

Group Piece-work

What advantages if any does the group piece-work system have over the individual piece-work system? I. O. F.

Many times a group of three or four or more men work on one job or are engaged in such close inter-related operations that the individual piece-work system cannot be applied and in such cases a group plan of payment seems the only way of establishing compensation based directly on the output. A foundry in Rhode Island has placed its clean-up work on a group piece-work basis and reports success. The manager says that a team work spirit has been developed which prevents loafing on the part of any one of the group. In this case a majority has the right to remove one member in the event of continued dissatisfaction. McC. K.

Work - to Tap the Reservoir of Experience

— 11 —

Uniform Quench Oil

In a small machine shop with tempering done at infrequent intervals and on many different classes of work, does the quality of the quench oil make any difference? In the past we have used any kind of oil in any condition, feeling that so long as it was kept at the desired quenching temperature that was all that was necessary.

A. M. I.

The cooling rates for different oils vary appreciably and this fact must alter the properties of steel quenched in different oils if other conditions are kept the same. We have found it an economy to go to considerable expense in keeping our quenching oils uniform. We even go so far as to test the viscosity of our oil as it ages. Different oils vary in their ability to withstand quenching of hot steel without altering their cooling properties. We have found mineral oils much more stable than the animal and vegetable oils. An easy way to check up on the quenching property is to take a sample of new high grade mineral oil and compare the effect of quenching identical parts in this oil and the old oil which has been used for a long time and which is to be checked.

L. O. C.

— 12 —

Welded-on Overlays

Can you advise me about the use of welding for building up worn parts such as slide bars?

S. M. W.

We have had considerable success with welded-on overlays on steel parts. We use an oxy-acetylene torch and a soft steel rod. The flame must be free from uncombined oxygen and should be played alternately on the rod and the metal which is to be overlaid.



TO whom shall we look to provide the impetus to start the increased production ball rolling? One of our problems of the past year and a half has been to balance our manufacturing costs with the reduced production represented by current business. It is argued that more urgent than this balancing is the need for increased sales. Perhaps this is so because we feel that our production costs have heretofore been well in line with modern practice and if we could increase our sales we would not need to make drastic changes. However a start must be made somewhere and the surest course to take has seemed to us to be a balancing of operating costs on the existing basis. Having done this our attention is now directed toward increasing sales.

A. Q. DAVIS,
Baldwin-Southwark Corp.,
Philadelphia.

We find that an operator soon becomes skilled in this type of work and is able to put on a relatively smooth layer about $\frac{1}{8}$ in. thick at the rate of $1\frac{1}{2}$ to 2 sq. ft. an hour. These built-up surfaces we grind down to dimension on Blanchard grinders.

J. C. O.

— 13 —

Advises Central Stockroom

Is the centralized stockroom the best way for a small manufacturer to handle his raw material?

J. C. C.

We find this question complicated by the question of departmentalization. We have two rather main products in our plant which have little similarity and which are used in separate departments and we find that it is an advantage to operate two stockrooms, one for each department. One stockroom would have the advantage of reducing the labor for attendance and card filing but we find that one bookkeeper and accountant can take care of the records of both of our rooms. For a varied line of miscellaneous small related products we feel that a centralized stockroom at a convenient location would be an economy in most plants.

W. A. G.

— 14 —

Speed of Welding

How fast should a good welding operator work using the common method of electric arc weld?

C. A. S.

The conditions vary so greatly that no definite answer to this question can be given. We find that a good welder using a $\frac{3}{16}$ in. electrode will deposit about $2\frac{1}{4}$ lb. of electrode per hour. If he uses a $\frac{5}{32}$ in. electrode his rate will drop to about $1\frac{1}{2}$ lb. per hour.

A. C. M.

Conveyors Synchronized by Photo-Electric Devices and Selsyns

A NEW mill at a steel plant in Youngstown, Ohio, has a pin conveyor that carries coils of rod away from the mill and delivers them to a hook conveyor. The coils of rod rest against pins spaced 10 ft. apart on the pin conveyor, and each coil is delivered to a hook on the hook conveyor, the hooks also being spaced 10 ft. apart. It is necessary that a hook arrive at the point of transfer at the same time that a pair of pins

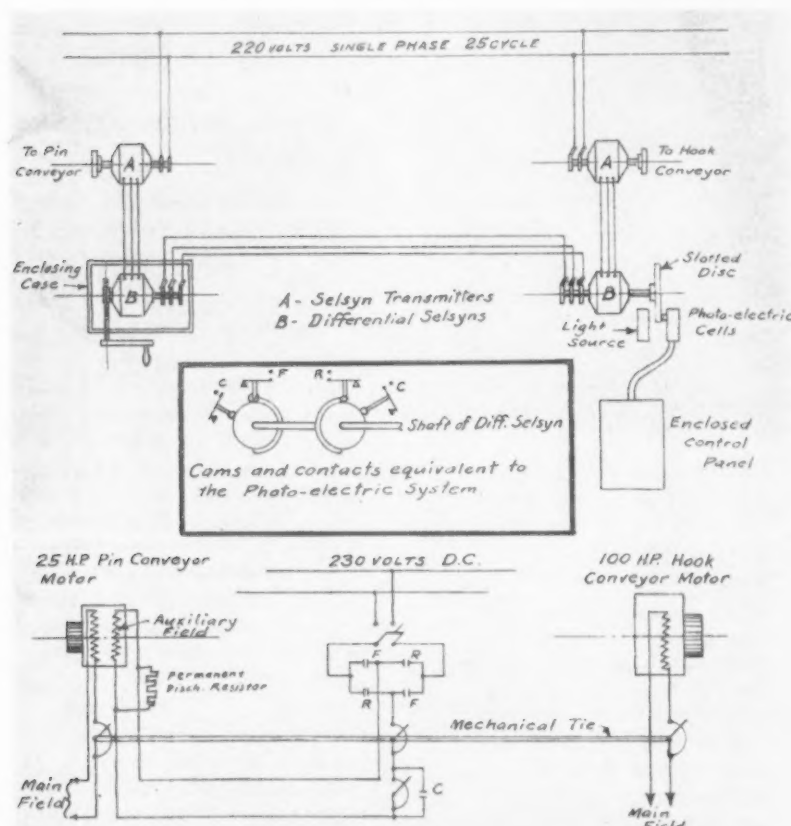
proper relationship whenever they are both again started in the forward direction. This requirement precludes a common drive for both conveyors, which otherwise would have been used to assure proper synchronization.

The rather simple equipment illustrated in the accompanying sketch was recommended as a solution of the problem. Selsyn generators* were geared to the two conveyor motors in

field of one of the conveyor motors. The sketch shows a system of cams and contacts which are equivalent to the photo-electric relays.

The equipment is arranged so that when the two conveyors are synchronized properly, the auxiliary field on the pin conveyor motor is de-energized. If the conveyors move out of synchronism slightly, the auxiliary field on the pin conveyor motor is energized in one direction or the other, depending on whether the pin conveyor is ahead or behind the hook conveyor. If the amount of correction thus obtained is not sufficient, and the conveyors tend to move further out of synchronism, a rheostat in the auxiliary field of the pin conveyor motor is short circuited, increasing the corrective effect.

The sketch shows a second differential Selsyn mounted in an enclosing case. This differential Selsyn is located out in the mill, and is provided with a hand crank so that the operator can bring the two conveyors back into synchronism, if they drift out because of slippage or stretch in the drive. The sketch also shows the arrangement of the field rheostats for the two motors, so that the turning of one rheostat handle will change the speed of the two motors in approximately the same proportion, and will at the same time vary the strength of the auxiliary field, so that approximately the same percentage correction can be obtained at top as at bottom speed.



THE pin and hook conveyors used for handling coils of wire rod in a large steel mill are synchronized by means of the Selsyns and other equipment shown in the sketch above. The system of cams and contacts which are equivalent to the photo-electric relays are shown, as well as the arrangement of the various field rheostats.

arrive, so that each coil may be safely transferred to a hook.

Furthermore, the conveyors must be arranged so that the hook conveyor may be stopped and the pin conveyor run backward, and yet both conveyors must return automatically to the

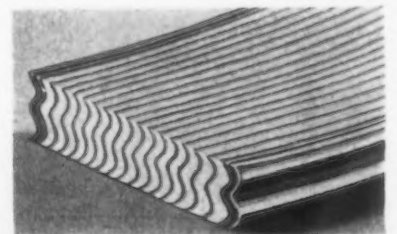
*Selsyn is the General Electric company's trade name for self-synchronous motors. These motors are similar to three-phase induction motors but have shuttle-wound rotors with definite poles, the windings of which are connected through collector rings to a single-phase alternating-current source of excitation. Two of these motors are used in a Selsyn system, one operated at the sending point as a generator and called the transmitter, and the other at the receiving point as a motor.

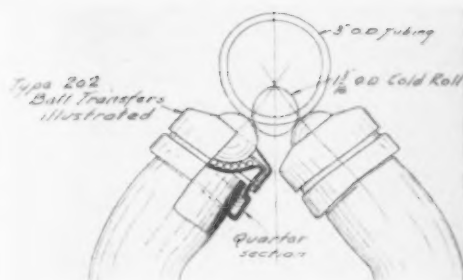
such a manner that each generator would make exactly one revolution for each 10 ft. of travel of the respective conveyors. This gear ratio was chosen to insure that the only point at which the two Selsyns could be synchronized would be such that a hook was opposite a corresponding set of pins. The stators of the two Selsyns were connected to a differential Selsyn in the manner shown, and a slotted disk was mounted on the shaft of this differential Selsyn. The disk was located between a set of light sources and a set of photo-electric cells, and the photo-electric relays were arranged to control an auxiliary

Develops Gasket for Severe Service

UNUSUAL resiliency in service is claimed for the Guardian gasket announced recently by the Garlock Packing Co., Palmyra, N. Y.

This gasket is made from a metal ribbon which is shaped to develop maximum resiliency and wound on special machines with intervening layers of asbestos. It is offered as providing safety against any pressure or temperature, resistance to gases and liquids, and tight joints under changing temperature. Its compression and rebound characteristics are said not to be destroyed when the gasket is tightened in the joint, the gasket adjusting itself without leakage to the expansion and contraction of pipe lines or other equipment subject to frequent or rapid temperature change or to vibration. Patents are pending.

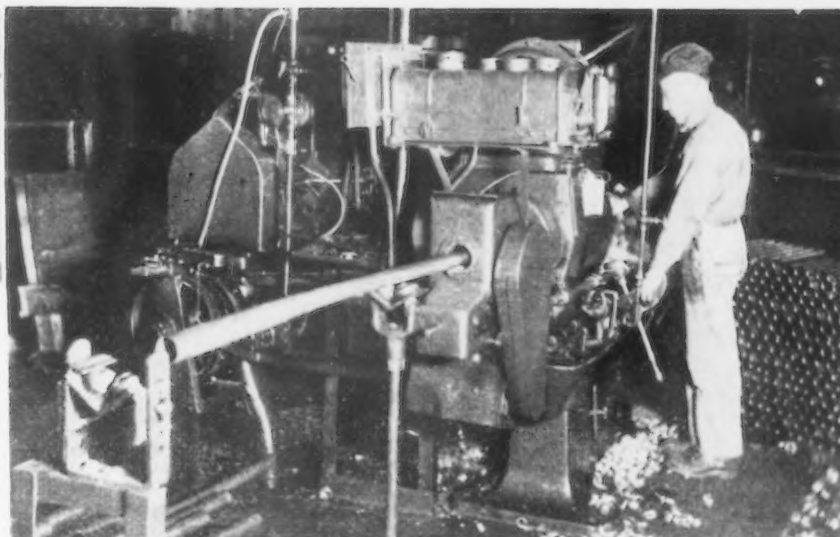




Ball Transfers Facilitate Feeding Cut-Off Machine

APPLICATION of the ball transfers made by the Mathews Conveyor Co., Ellwood City, Pa., to the feeding of round bars and tubing into a cut-off machine is here illustrated.

These stands can be designed in several different arrangements. They can be made up of a pipe leg set in a heavy base with the ball transfers mounted on top at an angle to suit the size of work to be handled, or they can be made up of welded steel angles arranged for mounting the ball transfers at a suitable angle. Another method is to use separate vertical pipe standards, bent at the top so as to permit suitable mounting of the ball transfers. It is also possible to



Details of the ball transfer used in the bar stand are shown in sketch at upper left.

weld two ball transfers on a piece of structural steel angle and fit a vertical upright underneath the bottom side of the angle. This automatically sets the ball transfers at a 45-deg. angle.

Two types of ball transfers are available; the type 202 for medium size rounds or tubing ranging from 1 to 3 in. outside diameter, and the type 500 for heavier stock ranging

from 3 to 8 in. O.D. A set-up using the type 202 ball transfers is shown in the accompanying line sketch. The large or load-carrying ball rotates on a bed of 105 3/16-in. diameter balls, the bed of balls being free to rotate without any pushing or crushing action. The raceway is designed so that the balls find other positions under the load-carrying ball while being rotated.

Electric Arc Cut-Off Saw

THE accompanying illustration shows an arc cutting saw recently developed by the Electric Arc Cutting & Welding Co., 152 Jelliff Avenue, Newark, N. J. The equipment employs the company's cutting and welding machine in connection with steel, carbon, or carborundum type wheels mounted on a suitable stand and driven by belt at high speed. It is described by the company as follows:

"The cutting wheel is one electrode and the work to be cut is the other electrode. Several hundred amperes at a low voltage pass between the cutting wheel and the work, the wheel revolving and presenting a new and cool surface to the work. The part of the work in contact with the wheel is melted away evenly and rapidly. Either alternating or direct current can be used, but because it is easier to get the necessary high amperage and low voltage from the a.c., the latter is generally used.

"For mild steel, a steel cutting wheel is used. Instead of wearing out, this wheel gradually gets bigger, because particles of the steel being cut get themselves attached to the wheel little by little, and this necessitates shaving the wheel to its original dimension from time to time.

"For certain types of alloys, carbon and other wheels are used. These wheels should be driven rapidly

(above 1800 r.p.m.) in order to clear out section being cut; it seems to be the fact that the faster the wheel speed the better the results. It is desirable to drive the wheel by belt so that in case of momentary sticking,

the belt will slip a little and free the wheel. Anyone with a welder can cut with this apparatus under license from this company or the machine with transformer complete can be furnished by this company."



A revised draft of recommendation R45-28, covering grinding wheels, has been mailed by the simplified practice division of the Bureau of Standards to all interests in the industry for review. New wheel sizes that are now in universal use have been added to the simplified list, and the tables listing standard wheels of various types have been rearranged to facilitate locating any particular wheel. The previous simplification program became effective Oct. 1, 1928.

Dust Recovering & Conveying Co., Cleveland, has organized a foreign business department, following adoption of a policy to license foreign manufacturers to build and sell its equipment. An office has been established at 77 Rue des Tanneurs, Brussels, Belgium, under management of Tevo, Ltd., consulting and industrial engineer. The company has also become associated with Power-Gas Corp., Ltd., Stockton-on-Tees, England, gas and chemical plant engineer and constructor, which will serve Great Britain and overseas dominions, excepting Canada.



Introduces Line of Radial Roller Bearings

THE Bantam Ball Bearing Co., South Bend, Ind., is manufacturing radial roller bearings having a full complement of rollers in the standard ball bearing metric sizes which allow complete interchangeability. Having two lips on the inner ring or cone and one lip on the outer ring or cup, these bearings take thrust loads in one direction. Tests at all speeds up to 10,000 r.p.m. show that they are more quiet than ball bearings.

As approximately twice as many rollers are used as balls, the radial load capacity of the bearings is said to be eight times that of a ball bearing.

Also, since the contact of a roller is many times that of a ball, the bearings have a long life. Due to their large radial capacity, this type of bearing is especially well adapted to applications where the design will not lend itself to a larger bearing and where the necessary load capacity must be obtained in a limited space, as on machine tools, electric motors, grinders, pumps and speed reducers.

Both the races and rollers of the bearings are made of high carbon alloy steel. Size and run-out tolerances are the same as for a ball bearing of equivalent size, as specified by S. A. E. standards.

Braided Wire Rope Slings

TWO new slings of braided wire rope are now being offered by Macwhyte Co., Kenosha, Wis. They are designated as Atlas and Drew slings.

The Atlas sling has a round body and is composed of two endless elements

of Monarch Whyte strand wire rope, one left lay and one right lay, spirally interwoven by a unique method through which all the multiple parts have the same degree of co-action and re-action to each other and

fully guaranteeing adequate attachment to the sling fittings. Its structure provides a round sling body having a tendency to soften the rope lays when subjected to tension and is said to assure a straight, non-spinning, flexible body throughout its term of service.

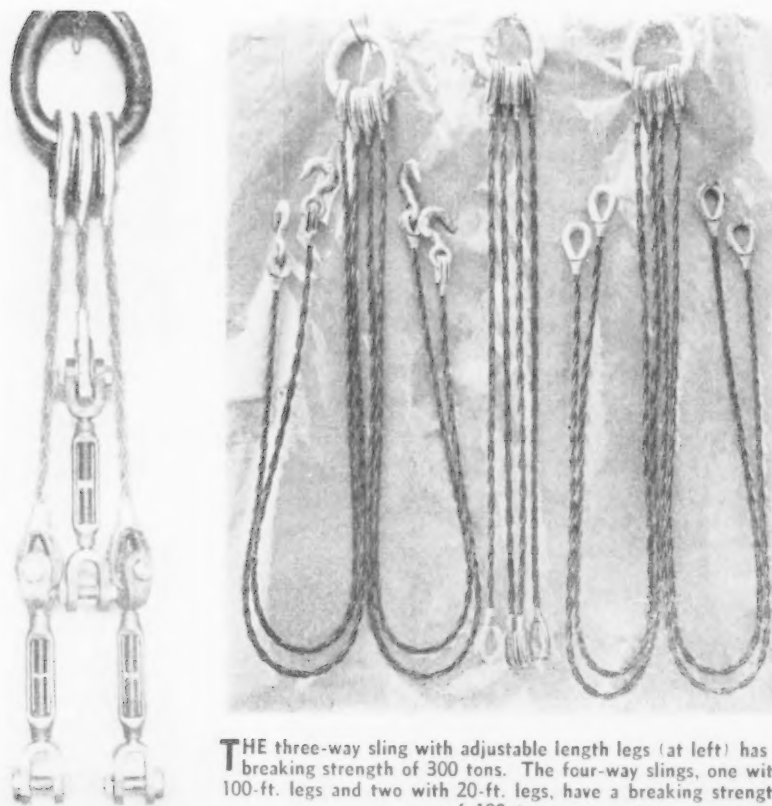
The Drew sling is composed of one endless element of Monarch Whyte strand wire rope, braided to form a flexible compact, flat surface, with a body approximately two cable diameters in thickness and 6 to 14 cable diameters in width, according to the number of parts employed.

As no thimbles or seizing are required for this type of sling, its light weight facilitates attachment to crane hooks. Being flat, it is easily extricated from beneath loads and its belt-like surface provides the greatest contact with the material being handled. Its flexibility and ease of handling makes it particularly adapted to boiler shop, tube mill and stone work. In basket hitches, this endless element equally distributes the load through the entire sling from hook to hook.

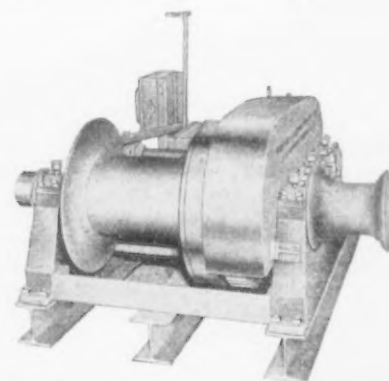
Combination Drum and Capstan Car-Puller

THE combination drum and capstan car-puller illustrated is designed for spotting a train of loaded railroad cars in either direction and at slow rope speed. The machine is built by the Fridy Hoist & Machinery Co., Mountville, Pa., and can be furnished in 7½, 10, 15 and 20 hp. ratings for spotting cars up to 500 tons.

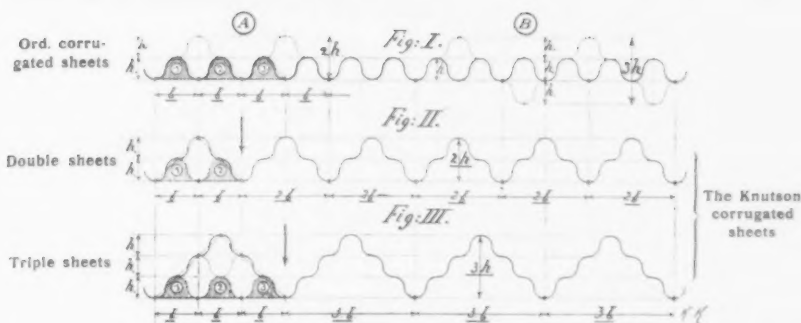
With this equipment one operator has control of all car replacements.



THE three-way sling with adjustable length legs (at left) has a breaking strength of 300 tons. The four-way slings, one with 100-ft. legs and two with 20-ft. legs, have a breaking strength of 100 tons.



For long hauls, from 300 to 900 ft., steel cable is used on the drum; for hauls of less than 300 ft., manila rope is used in connection with the capstan. Features include a double-V shaped, asbestos-lined friction clutch and an improved screw thrust, which are said to assure positive grip and release of the drum by a slight movement of the operating lever. This protects both the motor and the operating mechanism against excessive overloads when starting a heavy haul at a reduced rope speed. A triple spur-gear drive of cast steel is furnished, this gearing being inclosed in a cast-iron housing.



The single corrugated sheet is shown in the upper view and Knutson double and triple corrugations in the two views below it.

Multiple-Wave Corrugated Sheets

THE Knutson method of making multiple-wave corrugations in sheets, patented here and abroad and used by manufacturers abroad, is being offered under license to American fabricators by Knut Knutson, 165 Garfield Place, Brooklyn, N. Y. Single-wave (ordinary) corrugations and double and triple-wave corrugations are shown in the illustration.

The advantage of the Knutson corrugations, it is stated, is that they increase a sheet's strength and rigidity of section without requiring any increase in weight. Moreover, since they are like single-wave corrugated sheets in that they have only two axes of gravity, they may be bent and curved to any radius de-

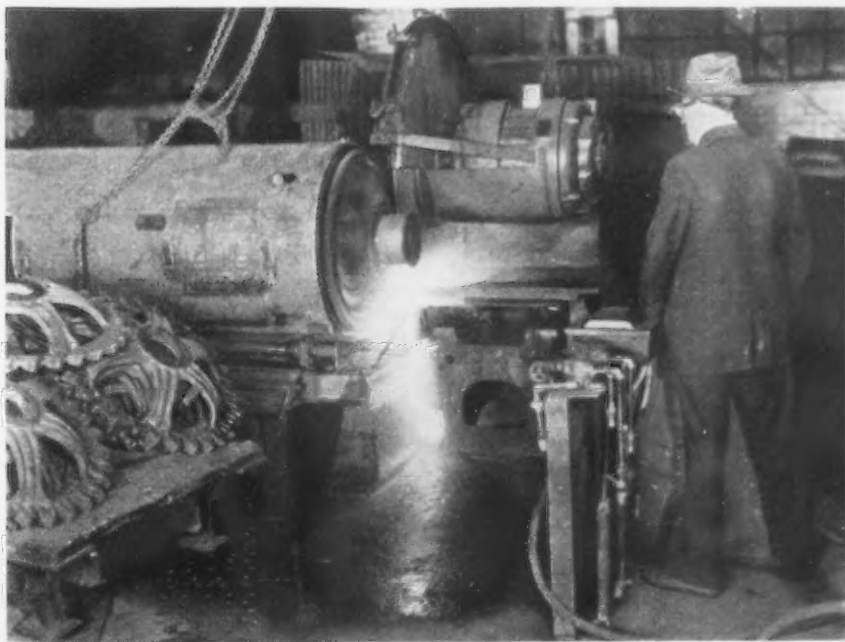
sired, it is asserted. Double-wave corrugation is said to increase the strength of a sheet 60 per cent above that of an ordinary corrugated sheet. Similarly, a triple-wave corrugation means a gain of 130 per cent in strength. Quadruple, quintuple and sextuple corrugations may also be made according to the Knutson method.

Because of the greater strength claimed for the multiple corrugations, lighter sheets can be used to replace ordinary corrugated sheets with consequent economy in outlay, it is stated. Among structures that have been sheathed with Knutson double-wave corrugated sheets in Europe are two dirigible hangars in Italy.

Friction Saw Removes Risers Rapidly

PRODUCTION has been increased and manufacturing cost reduced at the plant of the Harrison Steel Castings Co., Attica, Ind., by means of a Kling Brothers Engineering

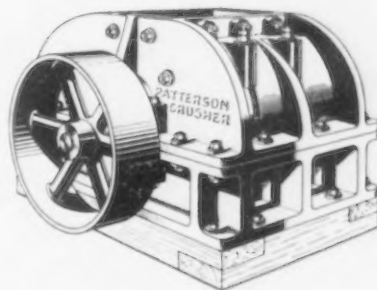
Works, Chicago, high-speed friction saw which is used for removing risers from steel castings. In this particular case a special fixture was developed for rotating cast-steel sprocket wheels



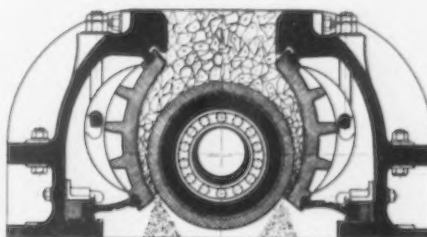
and pulleys while the risers were being cut off, as shown in the accompanying illustration. These sprockets are rotated while the saw advances to make the cuts. This arrangement permits the saw blade to make a minimum contact with the work which results in a cutting action that requires a minimum of power for the cut. The actual cutting time for a hub riser is less than 15 sec. and the floor to floor time is about 30 sec. per piece.

Ore and Slag Crusher of Simple Design

FOR crushing ore, slag, rock, limestone, ferrosilicon, ferromanganese and other materials, the Patterson Foundry & Machine Co., East Liverpool, Ohio, has developed the Gyro-



PROVISION for even wear of the surface of the crushing roll, the only moving part, is a feature.



centric crusher here shown. The machine consists of only three major parts, the frame, concave crushing plates and a cylindrical crushing roll which is the only moving part. The roll has an eccentric shaft which imparts a gyro-eccentric motion to the roll. The roll has a shell which does not revolve with its shaft but creeps slowly so that wear is distributed evenly over its entire circumference. Material fed into the hopper flows down and is crushed on both sides of the roll, gradual reduction taking place until it reaches the desired size.

The shaft is a chrome-nickel steel forging and the shell and crushing plates are made of manganese steel. The machine is equipped with roller bearings. Lubrication is at but three points through Alemite fittings. Advantages claimed for the machine include simple and rugged construction, low maintenance cost and large output.

War Debts Conference Will Be Major Challenge to Statesmanship

By DR. LIONEL D. EDIE

THE long-standing problem of war debts and reparations rolls up to another critical stage in June of this year. Authoritative observers in all countries recognize in war debts and reparations an overhanging cloud which prevents revival of international confidence in economic matters.

In the United States, an important school of thought contends that immediate and complete cancellation is the only solution and that the United States cannot realize any recovery from depression until this solution is adopted. At the same time, sensing the adamant opposition of Congress to cancellation, this school criticizes sharply the intelligence of Congress. If Congress is adamant, and if there can be no recovery in the United States as long as Congress is adamant, then logically, following the argument of this school, there can be no recovery in the United States in 1932, nor thereafter until Congress reverses its position.

When a problem crystallizes in such absolute form it is well to explore the possibility of a new road of attack. The absolutism of the cancellationists and the absolutism of Congress are extremist attitudes and offer a stalemate, not a solution.

Two Definite National States of Mind

As a starting point, it is necessary to recognize two definite national states of mind: (a) Germany will not pay reparations; (b) Congress will not cancel war debts. These are conditions, not theories.

The reason why Germany will not pay is because the reparations have become more than a question of cash; they have become a symbol of matters affecting the sense of national honor and national morale. They stand for the indictment of Germany as bearer of sole guilt for the war and they stand for the Treaty of Versailles.

Germany's refusal to pay is, therefore, a first step toward challenge of the Treaty of Versailles itself. It is an entering wedge for subsequent revision of the larger aspects of the peace settlement. There is no secret about the national consciousness in this regard.

For the United States to write a check for upward of \$12,000,000,000

PERMANENT solution of the war debts and reparations problem demands mutual sacrifice on the part of all interested parties. Congress will never agree to a settlement that imposes the whole burden of war costs on American taxpayers.

and so to wipe the slate clean of war debts, would mean *carte blanche* to Germany to disturb further the treaty of settlement. Perhaps the treaty is unjust in many respects. Perhaps some day it ought to be revised. But the writing of such a treaty in the first place was difficult enough and a re-writing at any time in the near future would raise questions shaking the peace of Europe.

Cancellation will not, in itself, quiet the nationalistic determination of a people looking toward revision. Consequently, it will not heal the political struggle which poisons European relationships. This political struggle is the ultimate root and source of the uncertainty which paralyzes credit in Europe and which suppresses international trade. Cancel war debts 100 per cent, and this basic uncertainty, this underlying threat, still remains. Reparations are only a sign on the surface; the politico-economic struggle is vital.

The other reality to face is the attitude of the American Congress. Apparently, this political body has an instinct that to cancel clean would be to make the American taxpayer an international "easy-mark." Which is better: to rail at Congress as stupid, or to seek a plan of settlement which involves some sacrifice on the part of every nation and which insures that magnanimity not only will be a grand gesture, but also will contribute in a real way to the future political peace of Europe?

Mutuality of Sacrifice

The second alternative requires application of the simple principle of mutuality of sacrifice among the nations concerned. This principle at once puts to a test the good faith of the debtor countries and offers to the

American taxpayer an assurance that his generosity is not to be abused.

What does this principle mean as applied to Germany? It means that Germany should be willing to surrender ambitions for treaty revision, with its attendant political turmoil, at least for a fixed period of time, and to renounce revision by force over the indefinite future. Some would argue that it also means Germany should be willing to make some further payment of reparations, although on a sharply scaled down basis, when business conditions become less subnormal. Willingness to carry part of the burden, however small, would help to convince other nations of German sincerity, but even this may be dispensed with if Germany's attitude toward revision of peace treaties can be such as not to interfere with the future security of the Continent. If Germany will not give such assurance, what do the 100 percent cancellationists hope to gain in the way of restoration of economic and political confidence by merely writing "paid in full" on a piece of paper?

The Principle as Applied to Great Britain

Great Britain is an ardent champion of complete cancellation. She receives as much from reparations as she pays in war debts. Cancellation means breaking even. It costs Great Britain nothing. She would bear no share of the burden; it is not surprising that she favors full cancellation. In the famous Balfour note, Great Britain has laid down the principle that under any settlement program she shall suffer no net, out-of-pocket, loss; the American taxpayer pays all.

On the other hand, mutuality of sacrifice requires that the British people should show a willingness to take on their own shoulders at least a modest part of the total burden. This implies abandonment of the rigid principle of the Balfour note.

As Applied to France

France receives substantially more from reparations than she pays in war debts. The excess she refuses to give up, because that would put a burden on her own shoulders. She is delighted to cancel up to the point where all the burden falls on the American taxpayer. Beyond that

point, where net burden would fall upon France, she refuses to go.

Mutuality of sacrifice would require that France should be willing to forego a substantial part of the unconditional reparation payments and to make that her share in the general burden.

Furthermore, in return for German renunciation of coercive revision of the treaty of peace, France owes the world some evidence of effort to reduce arms and to reorganize trade in Central Europe on non-political lines.

As Applied to the United States

In the United States, the practical question is whether the American bankers are willing to stand any part of the loss or whether the American taxpayer must stand all. Are the bankers willing to commute any of their receipts into funds for the relief of the war debt burden on the taxpayer?

Congress knows the terms and conditions under which banks created short-term credits and sold long-term German securities to the public. Congress knows that war debts were a prior claim and that the private credits were extended by people who are in the business of risk-taking. Now Congress is confronted with the demand: Pay private debts in full, cancel public debts in full. The play of self-interest in this demand is not even ingeniously concealed.

Conference Will Probably Extend Moratorium

With all parties still displaying determination to throw the whole burden on the American taxpayer, the question is in an impasse, and about all that can be expected of the forthcoming June conference is an extension of the moratorium. This will be disappointing to many people, but perhaps the disappointment will serve to bring all interests around to an attitude of equality of sacrifice.

As soon as any political leader can lay before the American Congress a plan of settlement in which France, Germany, England and the private bankers evince a disposition to share in the burden, Congress will undoubtedly interest itself in more liberal action.

Until that time, Congress has some duties to the taxpayers of this nation. The same people, in many cases, who are clamoring for "complete cancellation and no questions asked," are denouncing the Congress for failure to balance the national budget. Let it be borne in mind that even if Congress had passed the sales tax and had raised the exact amount asked by the Treasury, there would still have been, according to careful private estimates, a large deficit in the budget. Congress is with one hand denounced for not balancing a budget, even after taxes are extremely high, and with the other hand denounced for not further burdening the budget

with an added quarter billion dollars annually.

The tax burden of the United States in 1932 (National, State and local) may be estimated roughly as equal to one-third of the nation's income. The cancellationists offer this country a \$12,000,000,000 extra burden which eventually comes out of the taxpayer.

The Impatient Cancellationists

Impatience with Congress has led many cancellationists to declare that the debts will not be paid any way. How cancel a non-collectable debt? In this question, exasperation runs away with logic.

Outright default or repudiation is not a salutary example for such great creditor nations as France and England to set before their own debtors. The great powers will make important compromises before they will take the stigma of defaulters.

Why is the Lausanne Conference being called, if all debtors have already fully settled their minds that they simply will not pay? Why is this whole question the topic of conversation throughout Europe, if repudiation is already a *fait accompli*? Obviously it is the bias of impatience to say the debts are wholly uncollectable.

Manufacturers' Counsel Favors Beer Tax

WASHINGTON, April 19.—Fixing of the corporate tax rate at 13 per cent without the additional rate of 1½ per cent for consolidated returns was urged by James A. Emery, counsel for the National Association of Manufacturers, in testimony on the 1932 revenue bill presented before the Senate Committee on Finance last Wednesday. Individual credit for dividends received, he stated, should be restored and the taxpayer should be allowed to carry over losses for one year. The stock transfer tax, he said, should be limited, as originally recommended, to 4c. per share, with such rate for "short" loan purposes as Congress deems advisable. He said further that special manufacturers' excise taxes should be abandoned and that no import duties by way of taxes be carried in the bill. No tariff duty, he said, should be considered that has not been the subject of previous investigation and recommendation by the tariff commission.

To make up for the loss of estimated revenue of \$488,000,000 through the suggestions, Mr. Emery recommended a manufacturers' excise tax of 1 per cent, to yield \$200,000,000; the adoption of a stock transfer, sales and stock loan tax to raise \$28,000,000; and amendment of the Volstead act "to permit the regulation, manufacture and sale of wholesome, palatable cereal beverage, non-intoxicating in fact," to yield \$270,000,000.

The issue is still real, just as real as it ever was, and we are not going to make progress in its solution by the unsophisticated declaration that not a penny will ever be paid anyway.

The Way Out

The way out of the world controversy is by the common sense application of the principle of mutual sacrifice. That is, in my opinion, the only approach which has any hope of winning the approval of the American Congress. If the other countries involved are unwilling to accept that principle, then there is little reason for the American people to become the dumping ground of other people's debts.

The statisticians have piled up figures to show how the uncertainty about reparations and war debts has ruined world trade. Now these sums of money have become a symbol of more vital political struggles in Europe. All the old animosities which led up to the 1914 debacle are loose again. These are the danger spots: reparations are only a sign. We cannot root out the cancer by writing a check. The situation urgently requires realistic treatment, and such treatment implies application of the principle of mutuality of sacrifice.

Washington Steel Treaters Elect Officers

The Washington chapter of the American Society for Steel Treating at its meeting April 14 elected the following officers and executive committee:

Chairman, L. H. Fawcett; vice-chairman, L. Jordan; secretary-treasurer, S. J. Rosenberg; executive committee, E. C. Groesbeck, H. J. Huester, C. A. Margerum, W. H. Swanger and G. H. Yetter.

Open-Hearth Meeting

The Open-Hearth Committee of the American Institute of Mining and Metallurgical Engineers will hold its open-hearth conference at the William Penn Hotel, Pittsburgh, on May 24 and 25. On the afternoon of May 24 the participants will visit the plant of the Weirton Steel Co., Weirton, W. Va. The meeting had previously been scheduled to take place in Youngstown. Leo F. Reinartz, American Rolling Mill Co., Middletown, Ohio, is chairman.

I. S. Spencer's Sons, Inc., Guilford, Conn., is celebrating its seventy-fifth anniversary. In the beginning the company produced gray iron castings, but in later years developed the production of brass castings and general hardware. Its present products embrace iron, bronze and brass castings.

United States Led the World in Export Trade in 1931

WASHINGTON, April 19.—Instead of losing its foreign trade prestige, as seems to be the impression in many quarters, the United States led the world in exports in 1931, according to Secretary of Commerce Lamont. His statement was announced simultaneously with releases by the Department of Commerce of detailed figures showing exports by States.

"Even in a year of profound depression and drastic price decline such as 1931, the value of our domestic exports amounted to \$2,377,981,786, to which total every State and Territory contributed its share," said Secretary Lamont.

He explained that, although the value of exports in 1931 was 37 per cent smaller than in 1930, when they aggregated \$3,781,172,291, this falling off was due in large part to drastic price declines. In actual quantity, exports declined 20 per cent or only slightly more than the decline in domestic business. Exports in 1929 were valued at \$5,157,083,027. New York and Texas continued in 1931 as the first and second, respectively, in importance as exporting States. Exports from New York were valued at \$426,230,960, while exports from Texas were valued at \$324,370,164.

Exports of iron and steel, machinery, and metals in 1931 as compared with 1930, where comparisons are available, follow:

Alabama: Iron and steel plates, sheets, skelp and strips, \$2,001,259; (no figures for 1930); cast iron pipe and fittings, \$512,412 and \$550,135.

Arizona: Refined copper in ingots, bars and other forms, \$1,275,875 and \$511,542; manufactures of iron and steel, \$126,036 and \$277,701.

Colorado: Mining and quarrying machinery, \$781,838 and \$1,195,160; other machinery and parts, \$368,913.

Connecticut: Typewriters, \$2,475,447 and \$5,056,441; "other metal-working machinery," \$1,177,438 and \$1,304,473; "other electrical machinery and apparatus," \$1,077,781 and \$1,764,309; "other industrial machinery and parts," \$1,035,295 and \$2,205,274; ammunition, \$932,992 and \$1,197,644; brass and bronze manufactures, \$922,153 and \$1,895,186; sewing machines for factory or industrial use, \$872,604 and \$1,143,302.

Delaware: Iron and steel plates, sheets, skelp and strips, \$108,843 and \$268,058; "other machinery, vehicles and parts," \$86,828 and \$413,439.

Illinois: Combines, \$5,088,678 and \$3,552,694; "other industrial machinery and parts," \$4,171,155 and \$6,824,027.

Indiana: Passenger automobiles and chassis, \$4,285,259 and \$8,214,290; automobile parts, \$2,841,628 and \$3,191,014; motor trucks, buses and chassis, \$1,125,241 and \$2,179,541; iron and steel plates, sheets, skelp and strips, \$1,054,744 and \$4,018,295.

Iowa: Electrical machinery and apparatus, \$561,269 and \$783,142.

Kansas: Metals and manufactures, \$116,009 and \$590,470; "other machinery, vehicles and parts," \$112,934 and \$1,019,075.

Kentucky: Iron and steel plates, sheets, skelp and strips, \$1,230,726 and \$1,269,682; machinery and parts, except agricultural, \$259,660 and \$442,232.

Maine: Iron and steel manufactures, \$194,632 and \$331,794.

Maryland: Iron and steel plates, sheets, skelp and strips, \$2,732,860 and \$6,168,090; copper rods, \$2,219,809 and \$3,491,999; refined copper in ingots and bars, \$2,095,629 and \$8,069,287; "other manufactures of iron and steel," \$1,058,357 and \$1,221,311.

Massachusetts: "Other industrial machinery and parts," \$2,796,477 and \$3,748,348; textile machinery, \$1,833,299 and \$2,115,711; "other electrical machinery and apparatus," \$1,662,821 and \$2,561,824.

Michigan: Passenger cars and chassis, \$18,763,033 and \$61,721,028; automobile parts, \$15,260,402 and \$35,001,977; motor trucks, buses and chassis, \$6,047,439 and \$24,023,719; metal-working machinery, \$5,935,749 and \$2,566,161; accounting and calculating machines, \$2,650,275 and \$4,071,747; "other industrial machinery," \$1,935,520 and \$3,042,961.

Minnesota: Machinery and parts, except agricultural, \$1,092,990 and \$2,095,405; manufactures of iron and steel, \$384,443 and \$578,891.

Missouri: "Other machinery and apparatus," \$874,818 and \$2,353,786; motors, starters and controllers, \$860,249 and \$1,057,936; manufactures of iron and steel, \$484,262 and \$826,904.

Nebraska: Machinery, vehicles and parts, \$285,001 and \$150,875.

Nevada: Machinery, vehicles and parts, \$37,249 and \$113,874; metals and manufactures, \$19,594 and \$14,477.

New Hampshire: Mining and quarrying machinery, \$930,942 and \$998,841; knitting machines and parts, \$701,680 and \$742,388; "other machinery and parts," \$331,999 and \$353,269.

New Jersey: Automobile parts, \$9,084,154 and \$14,011,496; refined copper in ingots and bars, \$7,600,111; (no figures for 1930).

New York: "Other electrical machinery and apparatus," \$23,631,647 and \$45,268,531; copper and manufactures, \$22,623,589 and \$44,487,009; automobile parts, \$12,939,425 and \$20,427,808; motor trucks, buses and chassis, \$9,620,737 and \$8,695,903.

Ohio: "Other industrial machinery and parts," \$8,015,376 and \$11,759,138; metal-working machinery, \$7,306,119 and \$8,480,266; iron and steel plates, sheets, skelp and strips, \$5,695,944 and \$12,817,047; automobile parts, \$5,303,448 and \$7,669,084; "other electrical machinery and apparatus," \$4,849,079 and \$7,452,702; cash registers and parts, \$3,793 and \$6,747,866.

Pennsylvania: Automobile parts, \$18,027,929 and \$22,858,944; iron and steel plates, sheets, skelp and strips, \$8,165,425 and \$22,675,063; "other industrial machinery," \$5,168,426 and \$8,921,575; tubular products and fittings, \$4,854,592 and \$8,307,768.

Rhode Island: Tools, \$1,010,851 and \$1,229,406; textile machinery, \$935,701 and \$863,009; metal-working machinery, \$451,405 and \$1,181,892.

Tennessee: Aluminum plates, bars, strips, etc., \$434,474 and \$711,443; "other machinery, vehicles and parts," \$300,790 and \$655,711.

Virginia: Machinery and parts, \$1,433,017 and \$1,281,431.

Washington: Refined copper in ingots, bars, etc., \$7,740,463 and \$15,625,135.

West Virginia: Iron and steel plates, sheets, etc., \$1,916,824 and \$2,766,784; machinery, vehicles and parts, \$732,105 and \$524,888; "other iron and steel manufactures," \$684,118 and \$892,913; nickel and manufactures, \$679,304 and \$946,645.

Wisconsin: Passenger automobiles and chassis, \$3,757,335 and \$8,154,144; "other industrial machinery and parts," \$3,207,090 and \$4,029,235; construction and conveying machinery, \$2,723,002 and \$4,881,245; tractors and parts, \$2,381,559 and \$15,461,078.

Hoarding by Banks Is Charged by Contractors

Easement of credit for commercial and industrial uses, to the same extent as that afforded the financial institutions of the country through the creation of the Reconstruction Finance Corporation and recent liberalization of the Federal Reserve Act, is to be strongly urged at the spring meeting of the governing board of the Associated General Contractors of America, May 2 and 3, at Washington.

Pointing out that the Government has pledged a large portion of the resources of the American people to the revitalization of the credit structure of the country in order that business may be restored to higher levels and the widespread unemployment situation relieved, the executive cabinet of the contractors' association has submitted to the United States Chamber of Commerce for consideration at its annual meeting, May 16 to 20, at San Francisco, a formal call upon the banks of the country to pass the benefits of these increased credit facilities along to business.

"We believe that American banks have, in addition to the responsibility of safeguarding the funds of their depositors, the responsibility for making available at all times credit for commercial and industrial uses to the same degree in which they themselves enjoy its availability," the formal resolution reads.

"We call upon them to commit themselves publicly and actively to this responsibility while improving the liquidity of their assets through participation in the credit facilities of the Federal Government," it concludes.

Edward J. Harding, managing director of the association, in discussing the resolution, stated that, although the banks are enjoying the new liquidity which the recent Federal measures afford, they are remaining just as tight with funds as before the relief was provided. Hoarding by banks will nullify the benefits of Federal assistance just as much as hoarding by individuals, he said, and the question of breaking the credit jam will be one of the major questions before all business interests from now on until it is solved.

Steel Warehouses Concerned Over Low Prices on Imports

American Steel Warehouse Association, at Annual Meeting in New York, May 17 and 18, to Consider Report on Situation

A REPORT on the foreign steel situation as it affects the warehouse distributors of steel, particularly in seaboard cities, has been prepared for the American Steel Warehouse Association by Guy P. Bible, vice-president of that organization, who is an officer of Horace T. Potts & Co., one of the old-established steel jobbing firms of Philadelphia. Mr. Bible's report will be the basis of discussion of the foreign steel situation at the annual meeting of the association at the Hotel Commodore, New York, May 17 and 18.

During the past few weeks members of the American Steel Warehouse Association have been discussing with the steel companies the prevailing conditions brought about by the extremely low prices at which steel from Belgium, France and Germany has been sold, and are seeking some solution of a problem, which, they say, is threatening their existence.

Mr. Bible's report analyzes the situation as follows:

"The old established warehouse distributors of steel, who have been regular and constant buyers from American steel mills, are confronted with the necessity of making decisions which are of vital importance to their continued life.

"This situation is brought about by the continued importation of foreign steels into the United States; and, while it affects, up to the present time, principally the seacoast cities—Atlantic, Gulf and Pacific—it promises, because of facts hereafter stated, to become of increasing importance to inland cities, especially those on the Great Lakes. In a word, it can be accurately said that the problem is now, or is about to become, a national one in its scope.

"Most American steel merchants have in the past bought almost exclusively from American mills, this policy being dictated by habit and tradition, by a sound self-interest, and by a feeling that thereby they were contributing to the pool of general prosperity. It is still their desire to do this, but conditions have changed, and all American manufacturers should give serious heed to this statement of conditions.

"Perhaps the best way of appraising present conditions is to consider the area within a radius of 100 miles of New York City. There we find a large group of warehouses, handling foreign steel almost exclusively, have grown up alongside the older estab-

lished warehouses. This group is not, by habit, tradition or self-interest, tied to American manufacturers; but, on the contrary, their outlook is essentially European in all aspects. They embrace more than 30 warehouses, with stocks ranging from a few hundred tons to several thousand.

"The above condition has forced a second group of able, energetic, reliable warehouses, some of very long standing, to put in considerable quantities of foreign steel as a measure of self-defense, and to average down the cost of their total inventory. It is difficult to estimate the total foreign tonnage carried by this group of warehouses in New York, but it is believed to range between 6000 and 12,000 tons.

Foreign Steel Dominating New York Resale Market

"The commodities are chiefly bars, structurals, universal plates and floor plates. The range of sizes, rolled strictly to American standards, has grown from the original 30 or 40 to probably 300 sizes, and these are the most active and consequently the heaviest tonnage sizes. It is estimated that probably as much as 50 per cent of the tonnage of the active sizes in the Metropolitan New York area is foreign, and perhaps 25 per cent of the total sales of these sizes.

"It was quite possible in the past, and with entire accuracy, to cast considerable doubt on foreign steel, but each year has seen a steady improvement in every respect. European mills have improved on quality, finish, accuracy to size and straightness, and, as indicated above, have cut rolls to conform to American dimensions. They have, furthermore, learned how to ship, and the steamship companies have learned how to handle shipments; and the net result is that no longer can the marked defects of foreign steel be noticed, nor can criticisms of quality be justified by actual experience in working. This statement applies to the usual applications of the sizes in question. There is still the marked superiority of American steels for machine and engineering jobs where definite analyses and open-hearth steel are essential.

Competition on Price and Terms

"The whole gamut of price competition has now been gone through, beginning with the original cut of \$1 or \$2 per ton, from prevailing warehouse price, then to the stage of \$5 and \$10 cuts, which the warehouses

handling American steel met as best they could by instituting new quantity extras and finally by a price list issued by a warehouse formerly handling only domestic steel, which is confined to the wide range of sizes of foreign steel carried, and which frankly states that it is foreign steel, and makes prices based upon that fact, which range from \$20 to \$25 per ton below the warehouse price for domestic steel in the same quantity.

"These prices apply to a considerable range of sizes in bars and to the following:

Channels—4 in. to 12 in.
Angles—3 in. x 2½ in. x ¾ in. to 6 in. x 4 in. x ¾ in.

"A comparison of domestic with foreign prices out of warehouse is as follows:

Weights, Lb.	Foreign Price	Domestic Price
1000 and under	2.00c. net	3.10c. base
1000 to 3999	1.75c. net	2.90c. base
4000 to 5999	1.60c. net	2.70c. base
6000 and over	1.40c. net	2.70c. to 2.35c. base

(These, however, do not represent extreme prices, which, from some of the importers are certainly as low as 1.20c. per lb. net.)

"It is to be noted that whereas the foreign steel is sold at net prices without size extras, the domestic steel carries the American size extras. From this last statement it is apparent that deliveries by rail and motor truck can be made to important consuming centers, such as Trenton, Philadelphia, the Lehigh district, the anthracite district, and a wide area in New York State, as well as Connecticut and parts of Massachusetts, at prices far below the mill prices for domestic steel.

"It appears that unusual inducements in the way of terms are also offered. Considerable credit risks are taken, but this will bring its own correction. To responsible concerns, it would appear that terms as long as 90 to 120 days are granted, and that even note settlements beyond this time are frequently accepted. The importer also seems to grant long terms to the warehouses handling his steels. The contrast with practices in vogue on domestic steel is apparent.

Cost of Imported Steel

"The extreme price at which foreign steels can be bought is probably known only to the importer and the shrewdest of warehouse buyers. Prices as low as 1.05c. per lb. are openly quoted on bars, and 1.10c. on structurals, f.o.b. docks, duty paid. Delivery can be made to warehouse for \$1 to \$2 per ton additional. It should be borne in mind again that these prices include practically the whole range of bars and shapes which are rolled to American sizes, with no extra for size whatever.

"Evidently the condition is one caused by world economics, aggravated by the British abandonment of the gold standard and the consequent depreciation of many European currencies. While it is true that the currencies of France, Belgium and Germany have not depreciated, it is quite

evident that their prices for steel have been cut to meet the new situation set up by the present price of the pound sterling. From this it would appear that the present protection of the tariff is totally inadequate, and that Congress should restore the equilibrium to protect American industry. The Ways and Means Committee of the House has before it bills which aim to correct this situation. Depreciated currencies have affected so many industries that it is evident a grave emergency exists; consequently every effort should be made to secure the passage of bills which will help prevent further attacks on American industry.

"The National Emergency Conference, Carl E. Whitney, temporary chairman, 15 William Street, New York City, has already given very thoughtful consideration to this whole problem. The American Iron and Steel Institute should lend its backing, the American Steel Warehouse Association should cooperate, and all American steel warehouses and steel manufacturers should give their support—particularly through their officers, stockholders and the vast army of their employees. This is only a first step, but it is important that the bills themselves be studied by competent men to be sure that our own situation is adequately met.

"The next steps will be much less tangible and more difficult. They have to deal with publicity of the proper nature, and on a wide enough scale, the creation of public sentiment which will impel particularly those industries which are wholly dependent upon American industries, such as the power companies and other companies which are interdependent, to insist upon only American steel being used in all classes of material, machinery, etc., purchased by them.

"The easiest thing to do is to allow the matter to drift along its present course, taking what business we can, holding off from buying foreign steel, and thus facing what is evidently a dwindling business in an already very small market.

"The second alternative is for the American mills to meet the foreign price as nearly as possible. It would be most interesting and valuable to get the mills' reaction to this proposal. The nature of the response can perhaps best be judged by earning statements of American manufacturers for 1931.

"The third alternative is for the warehouses to buy foreign steel as largely as the circumstances require. It is obvious that once this is started by the better established warehouses, with their wide connections and knowledge of conditions, the effect on prices of domestic steel would be disastrous for the mills and for the country at large. It would in every respect be worse than the second proposal outlined above."

Machine Tool Exposition Is Postponed Until 1933

THE machine tool exposition, scheduled to be held in Cleveland in September of this year, has been postponed until September, 1933. This decision was reached by a large majority of the members at the annual spring meeting of the National Machine Tool Builders' Association at the Hotel Deshler-Wallick, Columbus, Ohio, on April 11 and 12.

The association's statement regarding the postponement of the exposition is as follows:

Aside from present business conditions, which were regarded as requiring increased emphasis on direct selling efforts, members considered 1933 more favorable for other reasons. They were influenced particularly by the fact that the Century of Progress Exposition at Chicago next year will bring many visitors from abroad who would arrange also to see a great display of machine tools, in which America still leads the world, both as to quality and output.

American machine tool builders have often exhibited in European industrial shows, such as the Leipzig Fair. These exhibits, while profitable in results, have been costly and necessarily limited in scope. The opportunity of showing the entire range of our machine tools to European visitors on our own soil was regarded as of unusual value. The total effect of an exhibition of new designs of high-production tools in every line will greatly augment the impressions to be gained from successive single displays. This is especially important at the present time, because recent quota restrictions and higher tariffs have put up hurdles against American exports to Europe which it will take increased efforts to leap. The 1933 show will be depended on to demonstrate convincingly that American machine tools still have a margin of producing capacity sufficient to absorb tariffs or invite their overthrow.

At the same time the new Cleveland auditorium, designed with special regard to the requirements of the largest exposition under power, will be ready next year. The new auditorium will be large enough to house in a single hall exhibits which in previous expositions were divided between two buildings. The new structure will be so arranged that visitors may see both machine tools and accessories without moving from one building to another.

The first day's program included the presidential address by Robert M. Gaylord, president of the Ingersoll Milling Machine Co.; the treasurer's report by George E. Randles, president of the Foote-Burt Co.; and the first statement by Boyd Fisher, new general manager. Ralph Flanders, general manager of the Jones & Lamson Machine Co., talked informally about "A Rummage Sale of Outworn Ideas," relating bits of history taken from the association's old records. Dr. C. J. Turck, president of Centre College, Danville, Ky., made an in-

spirational address at the dinner on April 11.

A resolution of tribute to the late Carl A. Johnson, the most recent past president of the association, was adopted by the association. The members urged the Senate Appropriations Committee to give adequate financial support to the Bureau of Foreign and Domestic Commerce in another resolution. The second day of the meeting was given over exclusively to group meetings which play such an important part in the association's activities.

Proposed Bale Tie Rate Approved in I.C.C. Report

WASHINGTON, April 19.—The proposed cotton bale tie rate of 27.5 per cent of the first class rates prescribed in the Southern revision case, to apply to Texas points, has been approved in a proposed report by Examiner Horace W. Johnson of the Interstate Commerce Commission. With bagging, the carload minimum would be 30,000 lb. On import and coastwise traffic coming through New Orleans, La., and Galveston, Texas City and Houston, Tex., proposed rate is the same, but would carry terminal charges also.

The examiner recommended cancellation of schedules proposing rates on iron and steel articles, including wire and nails. They propose grouping of the ports of Galveston, Texas City and Houston at the same rates, domestic, import and coastwise at all points in Texas beyond 400 miles, joint line, and 475 miles, single line, of Houston. To other points in the Southwest these ports are grouped at the same import and coastwise rates. The effect would be to establish mileage rates on these iron and steel products from the Texas ports to all destinations in the Southwest and at the same time continue in effect the specific import rates prescribed by the commission for these same ports to certain points in Oklahoma, Arkansas and southern Kansas. But where lower rates could be obtained by the use of scale rates of 51c. per 100 lb., plus port terminal charges of 3.25c., than the specific import rates, the lower rates would be applied.

Importers complained that it is difficult even under present rates to ship to the more distant points in northwest Texas in competition with domestic manufacturers and shippers at St. Louis, Chicago and Birmingham. The proposed rates, the importers said, would destroy the movement of iron and steel articles through Galveston to this consuming territory.

OFF THE ASSEMBLY LINE



Ford Motor Co. Buys Sheets and Strip Steel for 65,000 Automobiles

DETROIT, April 19.

THE pace of automobile production was accelerated slightly in the past week and indications are that operations during the next six to eight weeks will expand substantially as Ford output gains. The General Motors shows throughout the country were relatively successful, resulting in sales of about 5700 cars, some of which would have been sold without the stimulation of special exhibits. Plymouth orders have been sufficiently good so that the local factory is turning out 1100 cars a day. Considering its size and facilities, Plymouth is the busiest plant in the industry from the standpoint of assembly of cars.

Ford's progress still is dependent upon the ability at Rouge to supply motors, and motor assembly in turn is being delayed by trouble in casting the cylinder block in the foundry. The block is cast in one piece, this job being an unusually intricate and difficult task. Production of motors will be stepped up as rapidly as the motor department can secure cylinder blocks. The goal the past week was 700 motors a day, but about 600 a day was the highest point attained. Every effort is being concentrated on whipping the foundry problem, and upon its solution hinges the rate of the upturn in operations.

It is estimated that Ford has on hand 60,000 bodies at branch assembly plants and the stock of some parts runs as high as 100,000 units. On the other hand, only about 45,000 frames have been accumulated, the majority of which were made at the Rouge plant. This is a good example of how much out of balance stocks of various parts are. The number of motors available, of course, continues negligible in volume. The Ford company has tentatively scheduled 50,000 to 60,000 cars for assembly during May, but unless motor output is increased more rapidly than at present, the total will fall considerably short of those figures.

Ford places large orders for strips and sheets on April 19.

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Ford has tentatively scheduled 50,000 cars for May.

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Chevrolet will assemble about 45,000 cars this month.

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Plymouth is turning out 1100 cars a day.

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Late last week Ford gave releases for prompt shipment of full-finished sheets and strip steel for bodies to Briggs and Murray at Detroit and Budd at Philadelphia; the tonnage in the aggregate, however, was small, not exceeding 6000 tons. With considerable stocks of parts requiring steel already stored at branch assembly plants.

Today Ford placed orders for the sheets and strip steel for 65,000 cars, this being its largest steel purchase of the year. With Ford getting into volume production (100,000 cars a month) in June, steel mills will feel the beneficial effect of Ford expansion at a time of the year when normally they are anticipating a decline. It is entirely possible, and just now seems probable, that Ford's demands for steel during the coming summer will be sufficient to arrest the usual drop in operations and even point the production curve slightly upward. This will be especially true of steel mills in the Detroit district.

Ford has been exerting strong pressure to obtain lower steel prices, but thus far steel makers have stood firm in holding to present levels. It is not believed likely that concessions will be granted, because steel executives feel that the stabilization of prices is the brightest feature of the present situation. It is anticipated

that Ford's attempt to secure lower quotations will be continued, as Mr. Ford two months ago put himself on record in favor of raw materials suppliers going along at the then existing level without attempting to raise prices, declaring that such an attempt might thwart efforts to produce successfully a car at lower retail prices than model A.

Assembly of the new four-cylinder passenger car, to be known as Model B, was begun at branch assembly plants the past week. A liberal supply of four-cylinder motors is said to be on hand for this purpose. The new four-cylinder commercial cars likewise are now being manufactured. Deliveries of the V-8 are getting under way slowly. Ford has confined all production of this car thus far to Rouge. Employment at Rouge is now at 82,000, of which 64,000 are engaged in productive work and 18,000 in installing machinery and doing other non-productive tasks. A large amount of machinery is yet to be delivered to Rouge. The frame department is operating at a fairly good rate, but Murray's frame plant at Ecorse is going along at a slow pace. Several suppliers of malleable castings are working on quantity releases from Ford. Outside companies furnishing forgings likewise have been given word to go ahead on moderate schedules.

General Motors Concentrating Operations

Chevrolet is making about 45,000 cars this month, against an anticipated production at the beginning of the year of 70,000 cars in April. If operations at the gear and axle and forge plants can be taken as a basis, May output should be close to the current rate. In its program of reducing manufacturing expenses, General Motors is concentrating as much work as possible in its main plants in southern Michigan. Transmissions and other parts for Oldsmobile and Pontiac, for-

merly made by Muncie Products division at Muncie, Ind., will be produced either at the Pontiac factory at Flint or the Buick factory at Flint, and the Muncie plant will be closed. The Armstrong division at Flint, turning out springs for Oldsmobile, Pontiac and other cars, has been moved to the Buick plant. Observers believe that under the new set-up Chevrolet will be more of the General Motors main-spring, from a manufacturing angle, than heretofore.

Plymouth and Chevrolet are specifying steel on contracts at a fairly good rate; if it were not for these two makers, automotive consumption of

steel would be considerably flatter than it is. The first steel shipment of the season by water from Buffalo arrived late last week. Pig iron of special analysis has been delivered recently from the Hanna furnaces at Buffalo to Zug Island below Detroit, where it is stocked for later delivery.

By the end of April Plymouth will have assembled 30,000 of its new cars, Reo announced its six-cylinder car selling at \$995, a replica of the higher-priced Royale. Packard is now beginning shipments of its new twin six, while Continental Motors Corp. made the first DeVaux car under its auspices on April 15.

Seeks Cooperation from Those Supplying Raw Materials

WHEN we set out to build an airplane engine back in 1925, we were faced with a problem with which every new company is faced, namely, just where to stop one's own manufacturing and where to turn to other manufacturers for the development of parts and semi-finished material. By figuring backwards from the finished engine to the raw material we saw at once that all of the accurate machine work, assembling and testing would have to be done in our own plant. We knew that success was only to be had through the production of a thoroughly dependable engine and no matter how successfully the engine might be designed, the final test would come through the accurate work of skilled, loyal men in our own shop.

Nevertheless we felt that experienced manufacturers of semi-finished products throughout the country might have much to offer and we did not want to shut the door to this fertile prospect of assistance. We, therefore, decided to buy many products from outside sources. Thus in our new plant we did not include a forge shop and so felt free to put our many difficult forging problems up to the engineering staffs of the best forge shops in the country. The same was true in the case of castings. Outside foundries were encouraged to work on our development problems and manufacturers of aluminum and light alloy castings particularly were encouraged to develop new alloys and more efficient castings. This same principle has been applied to many other parts entering into the production of Wasp and Hornet engines and it is safe to say that the engineering staffs of at least a dozen experienced manufacturers are engaged in development work intended to improve the quality of our products.

The years since 1925 have served



F. B. RENTSCHLER

to entrench our original policy more and more firmly and I feel that it is due to this policy as well as to the spirit and loyalty of the men in our own shop that we have been able to produce a successful airplane engine.

F. B. RENTSCHLER, President
United Aircraft & Transport Corp.

Inland Steel Co., Chicago, has arranged for an exhibit at the Chicago World's Fair. Space has been selected in the Mineral Industries and Industrial Engineering Pavilion. Inland Steel Co. was incorporated in 1893, the year of the Columbian Exposition. Inland's display will include a graphic illustration of its development during the last 40 years and the steady growth of the industry from 1893 to 1933.

▲▲▲ OBITUARY ▲▲▲

JAMES MCCOBB SELDEN, president of the Selden Co., West End, Pittsburgh, subsidiary of the American Cyanamid Co., died at his home in Pittsburgh on April 12. He was born in New York in 1863 and located in Pittsburgh in 1906. He founded the company bearing his name in 1917, and had been its president since that time. Mr. Selden was also president of the Selden Steam Generator Corp., and the Selden Research & Engineering Corp., as well as a director in the American Cyanamid Co.

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WILLIAM NEWTON AGNEW, traffic manager and for the past three years assistant to the president of the Worthington Pump & Machinery Corp., Harrison, N. J., died at his home in New York, April 12, aged 56 years.

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WILLIAM C. GEWALT, vice-president in charge of production, Twin Disc Clutch Co., Racine, Wis., died April 8 after an extended illness. He was born in Germany in 1889 and received his technical education there, coming to America in 1909. He was associated as tool designer and machine builder with the former Mitchell Motor Car Co., J. I. Case Co. and Hamilton-Beach Mfg. Co. in Racine until 1919, when he was appointed superintendent of the Twin Disc Clutch Co. Two years later he was elected vice-president and works manager.

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RICHARD GARLICK, director of the Youngstown Sheet & Tube Co., Youngstown, died of a heart attack at Daytona Beach, Fla., on April 14, aged 60 years. He was at one time identified with the United Engineering & Foundry Co.

Construction Awards Gained in March

Construction awards in March in the 37 States east of the Rocky Mountains, while representing only about 30 per cent of the total in March, 1931, reflected a gain of about 26 per cent over awards in February, according to the F. W. Dodge Corp., New York. Of the total value of \$112,234,500 in awards last month, \$33,208,600 was in residential building; \$49,172,400 was in non-residential building, and \$29,853,500 was in public works and utilities. The contract volume in the first quarter amounted to \$286,078,700.

The ninth annual smoker of the New York chapter of the American Society for Steel Treating will be held at the Plaza Hotel, Jersey City, N. J., on the evening of May 3. The cost per plate is \$2.50.

PERSONALS

A. U. WIDMAN, works manager of the Cadillac Motor Car Co., Detroit, for the past 10 years, has resigned, effective May 1. For nearly two decades he has been recognized as one of the outstanding executives in the automobile industry. A native Detroit, in 1914 he joined Cadillac as night superintendent and in April, 1916, was appointed assistant production manager. Two years later he became production manager. In 1920 he was made assistant works manager and the following year assumed his present position. Prior to his connection with Cadillac he was for 10 years secretary and general manager of the C. W. Widman Co., a furniture manufacturing concern founded by his father, and subsequently joined the Auto Parts Mfg. Co., Detroit, as treasurer and general manager. After a vacation of several months, Mr. Widman will return to Detroit and devote his entire time to personal interests.

F. K. SIMMONS, formerly vice-president and general manager of the Henry & Wright Mfg. Co., Hartford, Conn., has been elected president, succeeding RICHARD HARTE.

H. R. CARVETH, president of the Roessler & Hasslacher Chemical Co., Niagara Falls, N. Y., has retired. He is being succeeded by CHARLES K. DAVIS, who was formerly identified with the Aluminum Co. of America and with the American Steel Foundries.

WAYNE EDDY has been appointed chief master mechanic of the Buick Motor Co., Flint, Mich. He formerly was connected with the Oakland Motor Car Co. in a similar capacity.

ERNEST R. STANDFUSS, vice-president, Harnischfeger Corp., Milwaukee, is sailing April 29 from Los Angeles on a world tour of six months. He will make his first stop at Honolulu to attend the Foreign Trade Council meeting on May 4 to 6, and will then proceed to China, Japan, Borneo, Ceylon, Sumatra, Siam, India, Greece, Africa, France, Germany, England and Russia, contacting with Harnischfeger representatives in those countries.

H. J. REESE, Independent Pneumatic Tool Co., Chicago, was elected president, April 14, of the Purchasing Agents' Association of Chicago, which held its annual meeting at the Great Northern Hotel. Other officers elected are: E. L. VAN VECHTEN, United Air Lines, first vice-president; F. F. PROCTOR, Mercury Mfg. Co., second vice-president; W. K. MC-



A. U. WIDMAN

CLURE, Wilson Jones Co., treasurer, and F. J. HEASLIP, Fairbanks, Morse & Co., secretary.

L. A. DANSE, chief metallurgist, Cadillac Motor Car Co., Detroit, and A. E. RHOADS, vice-president, Detroit Electric Furnace Co., Detroit, are to be the speakers at a meeting of the Detroit Foundrymen's Association on April 21, when the production of high-test cast iron in the electric furnace will be the subject for discussion.

ROBERT J. WALKER has been made vice-president and general manager of the Bradley & Hubbard Mfg. Co., Meriden, Conn.

WILLIAM S. STEPHENSON, formerly district sales manager in Philadelphia for the American Rolling Mill Co., and HARRY G. UPHOUSE, who was for many years Philadelphia district sales manager of the Donner Steel Co., have formed a partnership under the name of the Philadelphia Steel Sales Co., 1246 Commercial Trust Building, Philadelphia, and will represent steel companies in the sale of their products. The company has been appointed sales representative in the Philadelphia district for Otis Steel Co. and the Corrigan, McKinney Steel Co., both of Cleveland.

F. W. MCINTYRE, heretofore vice-president and sales manager of the Reed-Prentice Co., Worcester, Mass., has been elected general manager.

MARSHALL T. BALL has been placed in charge of the Grand Rapids, Mich., branch office, at 208 Fuller Avenue,

S. E., by the Reliance Electric & Engineering Co., Cleveland.

GEORGE A. NICHOLS, formerly New York district manager of the Wright Mfg. Co., has become identified in a similar capacity with the Kron Co., Bridgeport, Conn., manufacturer of industrial scales.

D. B. FRISBIE, who has been connected with the Barber-Greene Co., Aurora, Ill., for the past 14 years, has been appointed branch manager of the company's Pittsburgh office. In his long service he has been sales manager for the company in Cleveland, New York and in the South.

LOUIS W. GREVE, president, Cleveland Pneumatic Tool Co., and Champion Machine & Forging Co., Cleveland, has been elected president of the Cleveland Chamber of Commerce. RALPH H. WEST, president, West Steel Castings Co., Cleveland, has been elected a director.

Management Association to Hold Five-Day Meeting

Conferences devoted to public relations, general management, financial management and insurance have been arranged for the annual spring convention of the American Management Association, to be held at the Hotel Pennsylvania, New York, May 2-6.

At the general management conference, May 3, Ralph E. Flanders, vice-president, Jones & Lamson Machine Co., Springfield, Vt., will present a paper on "The Management Point of View on Economic Planning," and J. O. McKinsey, James O. McKinsey & Co., will discuss "Flexible Policies for Changing Conditions."

Speakers at the financial management conference, May 4, will include C. R. Stevenson, Stevenson, Harrison & Jordan, New York, on "To What Extent Will the Actual Scrapping of Excess Plant Capacity Enter into Our Final Industrial Readjustment?"; H. Parker Willis, professor of banking, Columbia University, on "Inflation, Deflation and Business"; Arthur S. Dewing, professor finance, Harvard University, on "Industrial and Financial Mergers in Boom and Depression"; and Dr. S. I. Miller, director of economics, R. G. Dun & Co., on "Credit and Financial Organization Under Stress."

The conference devoted to insurance, May 5, will include an address by P. D. Betterley, assistant treasurer, Graton & Knight Co., Worcester, Mass., on "Self-Insurance—How to Survey Insurable Risks." "Pressure Vessel and Machinery Insurance" will be discussed by P. E. Danneman, insurance manager, Thomas Edison Industries, Inc., on May 6.

• • EDITORIAL

Adjustments Will Speed Recovery

BUSINESS is now rapidly adjusting itself earnestly and courageously — or ruthlessly — to this condition of depression. Early in the period it was not doing that, and time was lost. The human element was at fault, as it has been before, and perhaps naturally enough for in quite different circumstances men were at sea and lost time on another occasion. For several months after Aug. 1, 1914, the most common question in business conversation was "How long do you think the war will last?" There had been a mild depression and the onset of the war intensified it. Men had the notion that there could be no good business until the war was finished, hence were curious to know how long they would have to wait.

Men ought to have known better for they had history. The outcome was that comparing the composites of **THE IRON AGE** in December, 1914, and December, 1916, pig iron rose 131 per cent and steel products 140 per cent.

It was not until June, 1915, that any news appeared of new steel works construction. A year later men were asking "How long do you think the war will last?" in totally different vein, for they wanted to decide whether there would be time for them to get their money back on new construction at the prevailing high costs. Steel had gotten very scarce.

In other words we need not feel so badly that time was lost in facing the facts of this depression and making preparation to meet the conditions. Of late readjustments have been proceeding rapidly, and there is this assurance, that wise readjustments will not have to be scrapped when times get better. Practices in a boom period are totally unfitted for a period of depression, but most of the practices adopted in depression will work well in more active times. We may be farther along in the job of reconstruction than is commonly supposed.

Government Extravagances and Loose Criticism

THAT there are extravagances in government is so painfully clear that the statement needs no supporting evidence. Federal, state and municipal governments all carry superfluous bureaus and employees. There are duplicated activities, lack of coordinated effort and other defects.

Just now the eyes of the nation are watching the attempt of Congress to pare down Federal expenditures. The tendency is to emphasize salary cuts and a rather reckless method of lopping off bureaus. President Hoover is again recommending a sensible plan of government reorganization and coordination which would result in large savings. Business interests have been aroused to

the situation perhaps as never before. The enormous Treasury deficit and the determination of business to avoid unnecessary taxes, if possible, are largely the contributing factors occasioning such widespread interest.

It is probably natural that a great deal of indiscriminate condemnation of government extravagances and bureauracy has been and is being made. This character of criticism reflects lack of knowledge of the subject and is unfair to many government bureaus which are doing splendid work for business and the people generally. The proposal to cut out extravagances and unnecessary government branches is heartily commended. But to carelessly strike at the government organization is unfair and it would be costly to business.

Bureau after bureau can be named which has come under unfair attack. Perhaps the one that has drawn most fire is the Bureau of Foreign and Domestic Commerce, Department of Commerce.

As a matter of fact it is a basic policy of this Bureau to be guided by advisory committees of business men who are not on the payroll. Under this policy no study or report is undertaken or printed without the prior endorsement of the industry, trade or science concerned.

It has been shown that, on a per capita basis, the Bureau spends only 80 per cent as much as the British and but 50 per cent as much as the Canadian government for trade promotion work. Now that world business is depressed and competing nations are preparing intensely for the turn in the tide, it would be the height of folly to desert American foreign trade in its hour of greatest need. For the Bureau has been a vast aid both to domestic and foreign business. Its appropriations have been about \$5,000,000 a year. Yet in 1931, voluntary statements from a comparatively few exporters reported that the Bureau had netted them \$57,000,000 in business. A rather well invested \$5,000,000!

The greatest difficulty is that Congress is endeavoring to apply mass economy when careful selectivity is the only system to follow if costly mistakes are to be avoided.

Production Control and Shorter Work Days

PRODUCTION control, whereby quotas are applied to various products and commodities and a shortening of the working day, are advocated by a number of industrial and economic notables. Such steps are viewed by them as part and parcel of our return to normal prosperity.

The idea of planned production, to curtail surpluses, is perhaps worthy of consideration in "good" times. At the present, however, it is hard to see how it would apply. The delinquent consumer is now exercising the most rigid sort of production control through a refusal to buy. Def-

C O M M E N T . .

icits in production, rather than surpluses, form today's problem.

By the same token, the matter of working hours is also being settled by the same delinquent consumer. The recognized number of working hours in the day is not as important as the actual number of hours worked per wage earner per week. And these are drastically curtailed, not through planning, but from necessity.

The key to production control has always been kept in the consumer's pocketbook. While our present social system endures, it will probably remain there.

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A Ray of Sunshine

TO the many thousands who are constantly looking for some encouraging sign in the industrial world, the recent report of the Massachusetts Department of Labor must bring at least a modicum of cheer. According to this report the number of wage earners in the state increased by nearly 5 per cent for February as compared with January and the weekly payroll in industry increased during the same period from \$2,981,000 to \$3,169,000, an increase of over 6 per cent. This increase is greater than has occurred between January and February in seven years, which fact surely offsets any purely seasonal trend. The chief industries represented in the expansion were boots and shoes and textiles, however, many other lines shared. Foundry products increased by 1 per cent. Some 200 men were added to the payroll in steam railroad repair shops and car construction plants in the state. The machine tool industry reported 40 additional employees and radio apparatus manufacturers added another 50. The average weekly earnings in all industries increased from \$19.48 in January to \$19.75 in February.

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Digging for Worms and Customers

Her efforts being unsuccessful and the visitor well acquainted with the plant and the management, he suggested that he look for them himself. After much vain searching about through sparsely populated departments, he found them in a corner of the plant yard. They were digging worms preparatory to celebrating the opening of the trout season.

"You are the first visitor that we have had today," remarked the president. "Normally, we should have had twenty-five or thirty callers by this time in the afternoon; a goodly percentage of them being salesmen looking for

business. Nowadays we find that very few salesmen call on us after the middle of the week. We have about the usual number on Mondays, Tuesdays and Wednesdays, but the rest of the week seems to be Sundays as far as they are concerned."

This is not the first report of this kind that has come to us. Half time work may be necessary in some of our plants, but half time selling effort may be one of the reasons for half time production. What we need now, more than ever, is an intensification of sales contacts. Executive personnel in many concerns has had considerable turnover in the past few months. There are new men who should be met and contacted, even in old companies. Intensive cultivation produces the best harvest in business and is especially necessary when the soil is "tired."

Are your salesmen getting discouraged after the middle of the week and giving their prospects as well as your own production chiefs time to go fishing?

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A Good Rule Works Both Ways

IN the March 17 issue of THE IRON AGE, in an editorial entitled "The Product Named, or Equal" we called attention to certain abuses in connection with the present day practice of writing specifications. "There can be but one best" stated this editorial, "and where this best is definitely known by the intending purchaser, the introduction of the phrase 'or equal' merely opens the door to the possible substitution, by the contractor, of inferior substitutes, to his own profit and the detriment of the buyer."

A good rule invariably works both ways. Where the "best" is not definitely known by the intending purchaser, or there are various offerings of equal quality, the restriction of the specification to a definite trade name may work injustice to other suppliers of equally meritorious products as well as to the buyer. This is pertinently illustrated in the case of patent licensees who produce, under various trade names, materials which are identical in composition, but which are variously named for the purpose of competition.

In this category fall some of the rustless steels. The purchaser of a material of this sort should be intent upon securing, not a trade name, but a material which will satisfy his requirements. In such cases the purchaser may be doing himself as well as potential suppliers an injustice by writing a "tight" trade name specification.

When the purchaser is certain that a given product will best serve his specific purpose, that one product should be specified, and bought. When there is no such certainty of superiority, the open specification, without mention of trade names, is likely to be more satisfactory to all concerned.

Steel Corporation's Dividend Policy Is Vigorously Defended

Chairman Taylor's Impromptu Remarks Feature Stockholders' Meeting

DISCUSSION of the policy of the directors regarding dividends featured the annual meeting of the stockholders of the United States Steel Corp. at Hoboken, N. J., April 18. In response to a protest made by Charles A. Roberts, an attorney representing some minority stockholders, that the cash position, amount of surplus and current earnings of the corporation entitled the stockholders to 7 per cent dividends on the common stock, Chairman Myron C. Taylor after the luncheon interval made a statement that was taken as a reply in that it dwelt on the attitude of the management respecting its actions.

Mr. Taylor started out by saying that at the moment the corporation was operating at a rate of approximately 20 per cent. "It is impossible," said he, "to achieve satisfactory results from a production basis as low as 20 per cent. As production declines, costs mount and we have been forced by events beginning in the summer of 1929 to retreat step by step from one position to another, always hoping to entrench ourselves in a position that would mark the culmination of the depression." These steps were taken with respect to dividends, salaries and wages, he added.

"Our quick assets—cash and salable securities, accounts receivable and merchandise of all descriptions located in all parts of the world—are not available for distribution except to a certain extent. We who measure the needs of the corporation, we who give to the utmost to preserve it, must take the responsibility to what extent it is possible or desirable to distribute the assets. We take that responsibility and have exercised it. We shall continue to do so, assuring you of our desire to recognize through our conduct the respective rights of all concerned."

He pointed out that the current assets at the end of last year—the funds relied on to conduct daily operations—had a book value of upward of 460 millions of dollars, whereas the amount of bonded indebtedness and preferred stock outstanding at that time was \$459,168,000, or only \$1,000,000 less. Against fixed property of \$1,700,000,000, the value of the common stock according to the closing stock exchange prices of April 15 represented a value of only \$300,262,194.

He offered also a bit of history in respect to sales. In 1902, the year of incorporation, 8,123,597 tons of steel

was sold. In 1913, the year before the war, 12,168,758 tons. In 1921, the time of the short, impermanent depression, 7,958,000 tons. In 1931, 7,676,000 tons, the lowest of any of the years mentioned. And capacity, he added, has grown in the interim.

In concluding his remarks, Mr. Taylor said: "We live in a world of strong, courageous, frank, honest people who dare to face facts. Prophecy of the future would be quite out of order. I have the utmost confidence in America and in American institutions of which this corporation is one."

Mr. Roberts had offered to amend the motion presented early in the meeting to ratify the acts of the administration since the last annual meeting. His amendment was defeated by a *viva voce* vote. His contention, among others, was that the net income in 1931 was over \$65,000,000, including special income, or more than sufficient for a 4 per cent dividend on the common stock. Yet by setting aside reserves, the income was converted into a \$49,000,000 deficit. He questioned making reservations amounting to over 100 per cent of earnings, and he would issue bonds against capital investments. He charged that the threat of a cut in the dividend rate was a major factor to bringing on a wave of liquidation in the stock market.

Mr. Taylor made an immediate answer that last year the liquid resources of the corporation were impaired to the amount of \$76,939,217, his more extended remarks coming after the luncheon recess, as stated.

Mr. Farrell Makes Farewell Address

James A. Farrell made an informal valedictory on his retirement from the presidency of the corporation and William A. Irvin was introduced as Mr. Farrell's successor. Mr. Irvin had at the outset of the meeting been elected a director for the term ending in 1935, together with George F. Baker, William J. Filbert, Junius S. Morgan, Jr., and Thomas Morrison, all of whom were reelected.

In introducing Mr. Farrell, Mr. Taylor mentioned Mr. Farrell's 50 years of service in the industry, all of it in the corporation or the preceding companies, and 21 years of it as president, "a competent executive, a good citizen and one who has established himself in the hearts of a great many of our people. His accomplish-

ments are many and great. He seeks retirement. This retirement is predicated in his own words on a desire to make place for younger men and more fully enjoy the after-glow of his business life as he looks on with us as others make the pace."

Mr. Farrell took occasion to praise the personnel of the corporation and expressed pleasure that his successor like himself was taken from the ranks. He reiterated his contention that he still thought we have had worse times than those of the past year. When he was 19 years of age, he said, he worked for a steel company which failed three times in 18 months. "I am leaving the organization with no tinge of regret. The finance committee asked me to remain as a director and I shall do all possible to assist the corporation in any way, shape or form for the rest of my life."

William J. Filbert, former controller and now vice-chairman of the finance committee, received an ovation and emphasized the increased efficiencies that had been effected in manufacture, and H. L. Austin, the new controller, was also introduced.

Steel Business Worst in 30 Years, Says T. M. Girdler

"Steel business at present is the worst it has been in the 30 years I have been connected with the industry," said T. M. Girdler, chairman and president, Republic Steel Corp., at the annual meeting of Republic stockholders in Jersey City, N. J., on April 13. Mr. Girdler stated that the operations last week of Republic plants averaged about 25 per cent. He ventured the opinion that the company could make a profit at 40 per cent of capacity with present price levels.

"In the first quarter this year," stated Mr. Girdler, "we got a little more than our share of the business. In 1931 we got a little less than our share and in 1930 also we got a little less. We have made several cost records through economies even at levels below 30 per cent of operating capacity."

B. F. Fairless, vice-president, said that the expected early increase in production of Ford automobiles should result in a larger demand for steel.

W. W. Hancock and Thomas F. Veach were elected directors to fill vacancies.

Gain in Employment

Reports to the Bureau of Labor Statistics, Department of Labor, Washington, show that 209 iron and steel plants employed 205,457 workers in February, an increase of 0.5 per cent over January. The weekly payroll in February was \$3,380,900, an increase of 4.2 per cent over January.

SUMMARY OF THE WEEK'S BUSINESS

Automotive Demands Contribute to Gain in Steel Ingot Production

Requirements of Ford and Other Car Builders, Resumption of Ensley Rail Mill and Heavier Tin Plate Output Are Factors

IRON and steel business remains at a low level, but it is not without constructive features. The determined campaign of the motor car industry to overcome the buying resistance of a depression-scarred public is making steady, if gradual, progress, which is reflected in improved steel specifications. Tin plate releases have gained, pushing tin mill operations above the 50 per cent mark for the first time this year. Rail output has increased with the resumption of the mill at Ensley, Ala. Steel ingot production for the country at large, which averaged 21 per cent a week ago, has risen to 22½ per cent of capacity, gains at Pittsburgh, Birmingham, Buffalo and Youngstown being partly offset by a loss at Cleveland.

Finished steel prices are holding, having apparently withstood the first test of sizable purchases by the automobile makers. Scrap, on the other hand, has shown fresh weakness, declines in heavy melting steel at Pittsburgh and Chicago forcing our scrap composite price to \$8.04 a ton, a new all-time low.

AUTOMOBILE demand for steel is featured by a Ford purchase of sheets and strip steel, exclusive of body requirements, for 65,000 cars. This material, estimated at 10,000 tons, supplements 6000 tons which was released for shipment to body builders a week ago. Owing to considerable stocks of bodies and parts on hand, the steel industry will not feel the full effects of Ford's increased production for another month or two. If, however, Ford assemblies reach a total of 100,000 in June, as is now expected, the steel mills will benefit from Ford expansion at a time of the year when they normally experience a decline.

Other makers of low-priced cars are also taking larger quantities of steel, as well as of pig iron, castings and miscellaneous parts. Relatively, Plymouth has made the best showing in assemblies to date, turning out 1100 cars a day. While Chevrolet's output for this month probably will not exceed 45,000 cars, its sales have registered encouraging gains. In the first

10 days of April Chevrolet dealers sold 17,452 new cars and 26,573 used cars. In new cars this represented an increase of 4000 over sales in the corresponding period in March.

IMPROVEMENT in tin plate specifications has been only partially reflected in mill operations, since producers are still shipping considerable tonnage out of stock. Consumers were expected to specify their June requirements by April 15, but the full amount of the tonnage released is not yet known. An inquiry for export to Japan calls for 22,000 boxes, while another for re-export is for 30,000 boxes.

Fabricated steel awards, at 7500 tons, are among the smallest of the year. Prospective structural work, however, has shown noticeable improvement in the Central West. Road work has been slow in getting under way, but is now progressing more rapidly. Inquiries for barges at Pittsburgh now call for 6000 tons, or double the tonnage first reported.

ALL forms of construction work, whether involving buildings, bridges, cast iron pipe or steel line pipe are severely handicapped by difficulties in financing. Typical of the situation is the experience of an Illinois municipality, which received literally dozens of contractors' bids on a projected water plant but not a single bid on the bonds authorized to defray the costs of construction.

Railroad interest in the steel market is limited to scattered inquiries for bridge work. Aside from the releases which made the resumption of rail output possible at Ensley, there is little to indicate a material gain in demand for track steel during the remainder of the first half of the year.

THE IRON AGE composite prices for pig iron and finished steel are unchanged at \$14.35 a gross ton and 2.087c. a lb. respectively.

▲ ▲ ▲ A Comparison of Prices ▲ ▲ ▲

Market Prices at Date, and One Week, One Month and One Year Previous,
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron	Apr. 19, 1932	Apr. 12, 1932	Mar. 22, 1932	Apr. 21, 1931
<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia.....	\$15.59	\$15.59	\$15.59	\$17.76
No. 2, Valley furnace.....	15.00	15.00	15.00	17.00
No. 2 Southern, Cincinnati....	13.82	13.82	13.82	14.19
No. 2, Birmingham.....	11.00	11.00	11.00	12.00
No. 2 foundry, Chicago*.....	16.00	16.00	16.00	17.50
Basic, del'd eastern Pa.....	16.00	16.00	16.00	17.00
Basic, Valley furnace.....	14.50	14.50	14.50	16.50
Valley Bessemer, del'd P'gh..	17.39	17.39	17.39	18.76
Malleable, Chicago*.....	16.00	16.00	16.50	17.50
Malleable, Valley.....	15.50	15.50	15.50	17.00
L. S. charcoal, Chicago.....	23.17	23.17	23.17	25.04
Ferromanganese, seab'd car- lots.....	\$75.00	\$75.00	\$75.00	\$80.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Ferromanganese quotations adjusted to carload unit; larger quantities at discount.

Rails, Billets, etc.

<i>Per Gross Ton:</i>				
Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	34.00	34.00	34.00	36.00
Re-rolling billets, Pittsburgh..	27.00	27.00	27.00	30.00
Sheet bars, Pittsburgh.....	26.00	26.00	26.00	30.00
Slabs, Pittsburgh.....	27.00	27.00	27.00	30.00
Forging billets, Pittsburgh...	33.00	33.00	33.00	36.00
Wire rods, Pittsburgh.....	37.00	37.00	37.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb..	1.50	1.50	1.50	1.65

Finished Steel

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.60	1.60	1.50	1.65
Bars, Chicago.....	1.70	1.70	1.70	1.75
Bars, Cleveland.....	1.65	1.65	1.65	1.70
Bars, New York.....	1.95	1.95	1.85	1.98
Tank plates, Pittsburgh.....	1.60	1.60	1.50	1.65
Tank plates, Chicago.....	1.70	1.70	1.70	1.75
Tank plates, New York.....	1.898	1.898	1.798	1.93
Structural shapes, Pittsburgh	1.60	1.60	1.50	1.65
Structural shapes, Chicago...	1.70	1.70	1.70	1.75
Structural shapes, New York	1.86775	1.86775	1.76775	1.9015
Cold-finished bars, Pittsburgh	2.00	2.00	2.00	2.10
Hot-rolled strips, Pittsburgh	1.40	1.40	1.40	1.55
Cold-rolled strips, Pittsburgh	2.00	2.00	2.00	2.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel	Apr. 19, 1932	Apr. 12, 1932	Mar. 22, 1932	Apr. 21, 1931
<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.20	2.20	2.20	2.25
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.30	2.30	2.30	2.35
Sheets, galv., No. 24, P'gh..	2.85	2.85	2.85	2.85
Sheets, galv., No. 24, Chicago dist. mill.....	2.95	2.95	2.95	2.95
Hot-rolled sheets, No. 10, P'gh	1.55	1.55	1.55	1.70
Hot-rolled sheets, No. 10, Chi- cago dist. mill.....	1.65	1.65	1.65	1.80
Wire nails, Pittsburgh.....	1.95	1.95	1.95	1.90
Wire nails, Chicago dist. mill	2.00	2.00	2.00	1.95
Plain wire, Pittsburgh.....	2.20	2.20	2.20	2.20
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.25
Barbed wire, galv., Pittsburgh	2.60	2.60	2.60	2.55
Barbed wire, galv., Chicago dist. mill.....	2.65	2.65	2.65	2.60
Tin plate, 100-lb. box, P'gh..	\$4.75	\$4.75	\$4.75	\$5.00

Old Material

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh....	\$10.00	\$10.25	\$10.25	\$12.25
Heavy melting steel, Phila....	7.25	7.25	7.25	10.25
Heavy melting steel, Chicago	6.87½	7.12½	7.12½	9.75
Carwheels, Chicago.....	7.00	7.00	7.00	9.50
Carwheels, Philadelphia.....	9.50	9.50	9.50	12.50
No. 1 cast, Pittsburgh.....	9.50	9.50	9.50	12.25
No. 1 cast, Philadelphia.....	9.00	9.50	10.00	11.50
No. 1 cast, Ch'go (net ton)...	7.00	7.00	7.00	9.50
No. 1 R.R. wrot., Phila.....	8.50	8.50	8.50	11.00
No. 1 R.R. wrot., Ch'go (net)	5.50	5.50	5.50	8.25

Coke, Connellsville

<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt.....	\$2.25	\$2.25	\$2.25	\$2.50
Poundry coke, prompt.....	3.50	3.50	3.50	3.50

Metals

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Lake copper, New York.....	6.00	6.00	6.12½	9.87½
Electrolytic copper, refinery..	5.50	5.50	5.75	9.50
Tin (Straits), New York.....	19.00	18.50	21.75	24.62½
Zinc, East St. Louis.....	2.75	2.80	2.77½	3.62½
Zinc, New York.....	3.12	3.17	3.14½	3.97½
Lead, St. Louis.....	2.90	2.90	3.00	4.25
Lead, New York.....	3.00	3.00	3.15	4.50
Antimony (Asiatic), N. Y....	5.87½	6.00	6.12½	6.85

▲ ▲ ▲ The Iron Age Composite Prices ▲ ▲ ▲

Finished Steel				Pig Iron				Steel Scrap			
April 19, 1932	2.087c. a Lb.			\$14.35 a Gross Ton				\$8.04 a Gross Ton			
One week ago	2.087c.			14.35				8.21			
One month ago	2.044c.			14.43				8.21			
One year ago	2.128c.			15.79				10.75			
Base on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.				Base on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.				Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.			
	High	Low		High	Low			High	Low		
1932	2.087c., Mar. 29	2.037c., Jan. 19		\$14.81, Jan. 5	\$14.35, Apr. 5			\$8.50, Jan. 12	\$8.04, Apr. 19		
1931	2.142c., Jan. 13	2.052c., Dec. 29		15.90, Jan. 6	14.79, Dec. 15			11.33, Jan. 6	8.50, Dec. 29		
1930	2.362c., Jan. 7	2.121c., Dec. 9		18.21, Jan. 7	15.90, Dec. 16			15.00, Feb. 18	11.25, Dec. 9		
1929	2.412c., April 2	2.362c., Oct. 29		18.71, May 14	18.21, Dec. 17			17.58, Jan. 29	14.08, Dec. 3		
1928	2.391c., Dec. 11	2.314c., Jan. 3		18.59, Nov. 27	17.04, July 24			16.50, Dec. 31	13.08, July 2		
1927	2.453c., Jan. 4	2.293c., Oct. 25		19.71, Jan. 4	17.54, Nov. 1			15.25, Jan. 11	13.08, Nov. 22		
1926	2.453c., Jan. 5	2.403c., May 18		21.54, Jan. 5	19.46, July 13			17.25, Jan. 5	14.00, June 1		
1925	2.560c., Jan. 6	2.396c., Aug. 18		22.50, Jan. 13	18.96, July 7			20.83, Jan. 13	15.08, May 5		

Demand and Output Show Slight Improvement at Pittsburgh

PITTSBURGH, April 19.—The local steel industry is still marking time, although favorable influences for early improvement continue to accumulate. Reports that leading automobile makers will release tonnage this week seem to be well authenticated, although new buying from this source is almost entirely lacking, and current specifications show little improvement. Structural inquiry is unusually heavy for the second week, and local barge builders are figuring on twice the tonnage reported last week. Reinforcing bars are moving in better volume, and limited improvement in demand for cold-finished and alloy steel bars is indicated by some companies.

Tin plate specifications for June shipment which are now reaching mills show a marked gain, and production has risen over the 50 per cent mark for the first time this year. At the same time specifications continue to exceed shipments, part of which are being made out of anticipated rollings. The pipe business shows no change, and large line pipe projects are slow to take definite form. Railroad specifications for track maintenance supplies are holding up, but rail releases are being deferred, and no car buying is in prospect. Steel ingot production in the Pittsburgh district has risen a point or two over the 20 per cent rate which has prevailed for the last two weeks. The smaller independent companies have accounted for most of the change, as the larger interests are doing well to maintain recent production schedules. Ingot output in the Valleys has risen to about 23 per cent, and may reflect further gains at any time. Production in the Wheeling district is holding its own. Finishing mill schedules are no higher, except in the case of tin plate.

The price structure is still gaining strength in the face of severe tests on sheets and strip steel. Large buyers have been unable to secure more than a nominal concession on sheets, and mills have turned down tonnage offered at lower figures. The test on bar, plate and shape prices may still be considered inadequate, although small orders are gradually establishing asking prices on a firm basis.

The scrap market has developed marked weakness in the last few days because of a lack of mill purchases, and continued low consumption at the principal points of shipment.

Steel ingot output rises from 20 per cent to 22 per cent in Pittsburgh district and has reached 23 per cent in the Valleys.

* * *

Tin plate production exceeds 50 per cent of capacity for first time this year.

* * *

Structural steel inquiry is heavy for the second week.

* * *

Scrap shows marked weakness, with heavy melting grade off 25c. a ton.

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Pig Iron

Small transactions make up the bulk of current sales, and shipments show scarcely any improvement over March. In fact, they are lower with some producers. The National Radiator Corp. is inquiring for 300 to 600 tons of foundry iron for shipment to its Newcastle, Pa., plant. No other significant inquiry is reported. Prices are nominally unchanged, and are holding fairly well, except in competition with iron from outside districts.

Semi-Finished Steel

Shipments show no change, although prices seem to be somewhat stronger. No recent sales are reported, and sellers seem to be adhering to quotations of \$27, Pittsburgh, on billets and slabs, and \$26 on sheet bars. Wire rods are well maintained at \$37, Pittsburgh or Cleveland, and most users are under contract for the quarter.

Rails and Track Accessories

Specifications for track supplies are holding up fairly well, and some makers report an improvement over March in their releases thus far in the month. The local rail mill is still operating in a limited way, but new releases for rails show little gain. Inquiry from the railroads is generally lacking.

Bars, Plates and Shapes

New inquiry for structural steel and reinforcing bars, as well as for steel barges, is the dominating feature of this market. Awards are somewhat heavier, but have not yet improved as much as inquiries. Road work and other outside activity has

been slow in getting under way, but is now going forward much more rapidly. Barge inquiry mentioned last week as calling for at least 3000 tons of plates has been practically doubled, although builders are not entirely convinced that all the business on which bids are being taken will be placed. Plate demand from other sources is very light, although railroad car repair shops are taking small tonnages. Merchant bars are somewhat more active, and releases of alloy steel bars by the automobile industry seem to be improving. The price structure shows no weakness, with bars, plates and shapes generally quoted at 1.60c., Pittsburgh. Reinforcing bars are quoted by mills at the same figure, except to distributors who enjoy the usual \$2 differential.

Cold Finished Steel Bars

Specifications are improving a little, but still leave much to be desired. Mill operations show no improvement. The price is maintained in this district at 2c., Pittsburgh.

Bolts, Nuts and Rivets

Demand has gained slightly since the first of the month, and prices are better maintained than they have been for several months. Expanding activity in the structural steel industry is responsible for such improvement in business as has developed. Railroads are buying very little at this time, although some of them are releasing material against old contracts.

Tubular Goods

Sizable line pipe inquiries of a definite nature are still lacking, although this is the season that such business is ordinarily placed. A number of projects are being considered, but most of them lack financial backing, and steel companies are unwilling to assume the burden of credit which would have to be extended if such lines are to be built. Demand for oil country goods shows no appreciable change, although this line still offers the best prospects for pipe business this year. Standard pipe has reflected slight seasonal gains, and mechanical tubing is exceedingly dull. Movement of boiler tubes is light, but fairly steady.

Wire Products

Both merchant and manufacturers' wire products are a little more active,

although improved demand can hardly be traced to any definite source. Jobbers continue to buy from hand to mouth, but their individual orders have been somewhat smaller than they have been. Movement of road mesh continues to show gains. Prices are well maintained.

Sheets

Local sheet makers report a little increase in releases, which has been registered without the benefit of the automobile industry. Electric refrigerator makers are still taking sizable tonnages, and electrical sheets are fairly active. Demand from jobbers, particularly in the Southwest, is a little heavier. Production is not much higher than it was last week, and still averages less than 25 per cent of capacity. Prices are receiving more of a test, particularly in the Detroit district, where some inquiry has appeared. In nearly all cases quotations are closely in line with the current market.

Tin Plate

Specifications last week registered rather considerable gains. Consumers were expected to specify their June requirements by April 15, but it will be a few days before the full effects of this business can be known. Some producers are still shipping considerable tonnage out of stock, but production has passed the 50 per cent mark for the first time this year. An inquiry for export to Japan calls for 22,000 boxes, while another for re-export will take 30,000 boxes.

Strip Steel

Specifications show little change from the recent low rate. The Ford Motor Co. has not yet closed against its recent inquiry, but is expected to do so this week. Releases from other automotive sources continue very light. Demand for corrosion-resisting strip is making a better showing comparatively than that for ordinary material. The price structure is considered firm by all makers, and has recently been tested on two or three very desirable orders. Hot-rolled strip is quoted at 1.40c. to 1.50c., and 1.50c. to 1.60c., Pittsburgh, depending on width, and cold-rolled is unchanged at 2c.

Coke and Coal

The coke market is as dull as it has been this year, domestic demand having reflected the usual seasonal decline. Scarcely any furnace coke inquiry is coming out, and foundries have not increased their requirements. Prices are weak and unchanged. Coal is correspondingly quiet, although railroad and industrial demand is holding its own.

Old Material

Absence of mill purchases and the inability of dealers to make shipments to a number of important consuming points have resulted in a definite

softening of the scrap market in the last week. While there is an even prospect of consumer purchases by one user this week, dealers are growing more anxious to take orders, and some of them are offering distress material at very low prices. Heavy melting steel is 25c. a ton lower, and dealers are able to purchase some scrap at even less than \$9.75. Hydraulic compressed sheets are even weaker, as dealers are unable to find a shipping point. The other steel works grades are down in sympathy with the tonnage products, although there is no quotable change in material for foundry consumption. However, specialties are very quiet, and present quotations are only nominal. Blast furnace scrap is unchanged following a decline last week.

Alabama and Chicago Irons Cut at St. Louis

ST. LOUIS, April 19.—Pig iron orders last week totaled several hundred tons, consisting of spot business in small lots. Hopes for increased demand are based almost entirely upon prospective expansion of operations in the automobile industry. Southern iron has been reduced to \$10, Birmingham, and Northern iron is now quoted at \$16 to \$16.50, Chicago. The St. Louis Gas & Coke Corp. is still quoting \$17.50, f.o.b.

Granite City, although it is meeting competition wherever the conditions warrant it.

Finished Steel

Mills report a slight pickup in specifications for plates and shapes for repair work in the Oklahoma and Kansas oil fields. Prices are firm. Warehouse business has slumped considerably this month compared with the same period in March. New wage scales about \$2 a day less than those paid heretofore became effective in the building trades Friday, and are expected to bring out some dormant construction projects.

Old Material

Dealers are without orders, and mills give no indications as to when they will place them. The leading consumer of busheling and borings is out of the market for this month. Prices are nominally unchanged. Railroad lists: Chicago, Burlington & Quincy, 5000 tons; International-Great Northern, 1500 tons; Chicago & Alton, 850 tons.

United Engineering & Foundry Co., Pittsburgh, has concluded an arrangement with the Dominion Engineering Works, Montreal, Canada, whereby the latter company has been licensed to manufacture rolling mill equipment and auxiliary machinery from the United company's designs for use in Canada.

Prices Are Firmly Held in Valleys, With Production Improved

YOUNGSTOWN, April 19.—Favorable sentiment still prevails in the Valleys, although current releases for finished steel are still rather light. Ingot output now averages 23 per cent, with further gains in prospect.

The booking of a small line pipe order by the Republic Steel Corp. last week brought some hope of further business from this source. However, most prospective line pipe inquiry is rather indefinite, and local sales representatives are not very hopeful about the placing of heavy tonnages this year. Oil country goods are still quiet, but gradual improvement throughout the year seems to be in prospect.

Demand for sheets has failed to show any strong impetus, and the trend of automobile buying seems to be the one important factor in demand. Tin mill production has risen somewhat in the last week or two, with independent and Corporation mills in the Valley averaging about 50 per cent of capacity. Specifications are said to be running ahead of pro-

duction, but some of this business had been anticipated. Wire products have shown limited spring gains, but business is not encouraging. Reinforcing bars are more active, but plate tonnage is very disappointing.

Prices continue to hold on the entire line of finished steel products, and old contracts at lower figures are gradually being cleared from company books. By the first of May the new schedules on all products will be in effect on at least 90 per cent of mill shipments, bringing about a uniformity in the price structure which has not been encountered since the business depression began. However, most steel products are being turned out at a loss because of low operations, and a further advance in quotations is being considered. Both the scrap and pig iron markets are weak, although little business in either product is being placed. Scrap in particular is depressed by a surplus of material on track, for which it is difficult to find a consuming point.

Chicago Feels Stimulus of Growing Demand from Motor Car Industry

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CHICAGO, April 19. — Specifications in the iron and steel market are moderately increased by releases from the automobile industry and there is promise of further betterment, though at this time no material improvement in mill output is in sight. Ford, Chevrolet and Chrysler are releasing more steel, pig iron and parts orders, but Nash and Studebaker have dropped output to lower levels.

Some improvement is noted in railroad bridge work, but the car market is uninteresting except on the basis of reports that railroad buying in the last half of the year will be measurably better than in the first six months. The building industry is inactive, and it is more noticeable every day that public work is lagging under the weight of the slow movement of the bond market.

In the face of all factors prices are fairly steady, the exception being local quotations on scrap. Dealers expect still lower prices and therefore argue that any sale now is a good move from the viewpoint of profits. This attitude is prompting offerings at less than current quotations. Many grades have not been traded in for a month or more and prices therefore are nominal.

Pig Iron

Malleable foundries are getting more orders from automobile manufacturers and they expect releases to gain in the next few weeks. Miscellaneous inquiries remain small, but they are more numerous. Shipments of Northern foundry iron are practically even with those of March, but with the prospect of several steel makers re-entering the market, a more encouraging volume is looked for in the closing days of the month. Charcoal iron is moving slowly at \$20 a ton, furnace, and a few carloads of Southern iron have been taken at \$10 a ton, Birmingham, plus full differentials.

Bolts, Nuts and Rivets

Prices are holding in a market that is dull so far as sales and specifications are concerned. Jobbers are taking small fill-in lots. Shipments to farm equipment manufacturers have practically ceased.

Rails and Track Supplies

The local rail market is without

Motor car makers release larger orders for steel, pig iron and parts.

* * *

Building industry and cast iron pipe trade held back by unfavorable bond market.

* * *

Railroad bridge work is more promising, but rolling stock demand is at low ebb.

* * *

Scrap is soft, with decline in heavy melting steel and other grades.

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feature except that releases are permitting mills to maintain uniform schedules that will hold for about three weeks longer. The Chicago & Alton has called 300 men for track work, but this railroad has not as yet bought rails. It was recently acquired by the Baltimore & Ohio and the supposition is that its supplies may come from the parent railroad. The character of new business now reaching mills suggests that contracting will remain dull for some time and that railroads will buy rails in small lots as needed. Orders for track accessories are more numerous, but the aggregate tonnage is smaller than earlier in the month. The character of these orders indicates that stocks in the hands of the railroads are very light.

Plates

A small tonnage of plates has been moving to Milwaukee for a light pipe order. Pipe production schedules in this territory are extremely slack and, as in the case of tanks and other equipment for the oil industry, there is little in prospect at this time. The railroads are making no open moves toward the purchase of cars and very little car repair work is being given to independent shops. There is still no evidence that anything but the very lightest of repair work is being undertaken in railroad shops. Some plate tonnage will be needed for locks on the Illinois River at Marseilles, Ill. Placing of the general contract on this work is near at hand.

Structural Material

Only a few structural projects are near the closing point and these are getting the attention of fabricators from a wide circle around Chicago. Several of the World's Fair buildings are near the closing point and steel will soon be ordered for the locks on the Illinois River. New bridge work is coming out in Wisconsin, Indiana and Iowa. The railroad side of the market has been given a boost by the Union Pacific's move to purchase 2500 tons of steel for bridge work in California. Locally inquiries for small railroad bridge work are more numerous and some fabricators are encouraged over the outlook in that direction.

Cast Iron Pipe

Purchases by Cedar Grove, Wis., and St. Louis constitute the bulk of transactions. Carload inquiries and orders are lighter and prices have a weak tendency. Literally dozens of contractors entered bids on the Wilmette, Ill., water plant, but so far not a single bid has been entered for the bonds. This job, like many others, is being held back by the inability to carry through financing.

Reinforcing Bars

Shipments for Illinois road work are gaining in volume. Private work remains practically at a standstill. The few new inquiries for 100 tons or more each are all for public work.

Wire Products

Output is steady at 25 per cent of capacity and shipments are in line with this figure, so that there is little change in the size of mill stocks. Reinforcement mesh is getting away to a slow start this spring. Prices remain steady.

Sheets

Demand from container manufacturers is more spotty. However, they remain the most active consumers of sheets in this district. Outdoor work is contributing little to mill books.

Old Material

The entire market has turned soft. Sales of heavy melting steel have been made at lower levels. A boat load of borings will move from Chicago this week and a second cargo will immediately be loaded.

Cleveland Ingot Production Declines to 20 Per Cent

Finished Steel Demand Very Light—Lake Ore Movement This Year May Not Exceed 13,000,000 Tons

CLEVELAND, April 19.—Demand for finished steel continues very light. Ingot production in Cleveland has fallen off six points to 20 per cent of capacity this week, the lowest since last August. While not much new business is being placed by the automotive industry, some new releases of strip steel came from that source during the week. Operations of metal-working industries other than automotive show no gain.

Outlook in the ore industry this year is far from promising. Shipping schedules of consumers having long term contracts or affiliations with mining companies will be greatly restricted. No inquiries have come from open market buyers, and consequently prices have not been named. Ore stocks at furnace yards and docks April 1 were nearly 3,000,000 tons larger than on the same date last year and about 14,000,000 tons greater than normal. In view of light consumption and large stocks, the movement this year will fall far below that of 1931; some estimates place this year's shipments at as low as 13,000,000 tons.

The most satisfactory feature of the present situation is the firmness of prices on practically all steel products. Bars are being maintained at 1.65c., Cleveland, and plates and shapes at 1.60c., Pittsburgh. Regular quotations on hot and cold-rolled strip are being adhered to and for the small sheet orders that are being placed no deviations from regular quotations are reported.

Pig Iron

New demand from the motor car industry has stimulated activity. A consumer in this territory has purchased 1000 tons of malleable iron for May and June shipment, dividing the business between two Lake furnaces, and a Muncie, Ind., melter is inquiring for 1000 to 1500 tons of malleable iron for the same delivery. Another foundry making motor car castings purchased 500 tons of foundry iron. Shipments this month continue heavier than in March. Better demand is expected from stove and furnace manufacturers in May. Prices are unchanged at \$15.50, Cleveland, for foundry and malleable iron for local delivery and \$15 for outside shipment, with concessions from the latter price for delivery to competitive points.

Iron Ore

Consumption of Lake ore in March amounted to 1,255,904 tons, an increase of 81,410 tons over February. This compares with a consumption of 2,835,439 tons in March last year. Furnace stocks on April 1 amounted to 28,773,775 tons and the amount at furnaces and Lake Erie docks on that date was 34,491,289 tons, against 31,516,059 tons on the same date last year. There were 57 furnaces in blast using Lake ore March 31, an increase of two for the month.

Sheets

In the absence of orders of any size from stamping plants in this territory supplying the motor car industry, the market continues very dull. The recent increase in production of Chevrolet bodies is being maintained at the local Fisher Body plant and new purchases of sheets for this plant are expected shortly. Orders from some of the electrical refrigerator manufacturers have been curtailed considerably. The metal furniture industry is ordering very little steel. A moderate seasonal demand has developed for corrugated galvanized roofing. Prices are well maintained.

Bars, Plates and Shapes

There is little new demand for these products. Inquiries of any size for structural steel for building and bridge work are very scarce. However, quite a few small-lot inquiries are coming out in the building field. Reinforcing bars show an improvement. Inquiries are out for 500 tons for a building for the Quaker Oats Co., Akron, and for 200 tons for a sewage disposal plant in Norwalk.

Strip Steel

Some fairly good releases of both hot and cold-rolled strip were issued during the week by General Motors Corp'n. subsidiaries in Indiana making automobile accessories. After a short period of curtailed operation these plants are again stepping up production. Otherwise there is little activity. Regular prices of 1.40c., Pittsburgh, for wide and 1.50c. for narrow hot-rolled strip and 2c., Cleveland, for cold-rolled material are being well maintained.

Old Material

No new demand has developed and because of hold-ups virtually no scrap is being shipped to consumers' plants.

No. 1 heavy melting steel has declined 25c. a ton and compressed sheet scrap and machine shop turnings are lower. While output is very light, some scrap is accumulating in producers' yards.

Warehouse Prices on Sheets Up at Los Angeles

SAN FRANCISCO, April 18.—April volume in warehouse and out-of-stock requirements has declined slightly from March, but is in excess of the February low. The market is firmer and price schedules are being adhered to. Effective today Los Angeles warehouse prices on galvanized and annealed sheets are advanced 0.15c. per lb., making the new prices 4.20c. for No. 24 hot-rolled annealed and 4.50c. for No. 24 galvanized in minimum quantities. This is in line with other Pacific Coast schedules and passes on the mill advance of April 1.

Reports on foreign steel imported during February indicate a marked decline in receipts of bars and shapes, with an approximate total of 1000 tons, which is half of the January average. An additional 500 tons of wire nails, principally from Germany, is in line with previous importations and represents over half of the receipts into the entire United States.

Awards of reinforcing bars on major contracts reported total 1500 tons. New inquiries call for 800 tons. No important structural awards are announced, though a number of new highway bridge projects have been set for bids. Los Angeles opened bids on 5000 tons of cast iron pipe, with four suppliers low on a division of the total, and Yakima, Wash., placed 1500 tons with R. D. Wood & Co.

Canadian Fabricators Have Good Backlogs

TORONTO, April 19.—Merchant pig iron sales in Canada are still limited mainly to single carlots, with weekly bookings running around 500 to 600 tons. Pipe foundries are buying some iron, but otherwise the market is quiet. Pig iron production is holding around 20,000 tons monthly with two stacks blowing. Imports are negligible. Prices are unchanged.

In structural steel slight improvement has developed in sales, although no awards have exceeded 1000 tons. Fabricators are operating at about 50 per cent and have good backlogs.

While there was a slight flurry in scrap sales several days ago, new business has again dropped off. Some business was booked recently for heavy melting steel and turnings, but present shipments are few and restricted to small-tonnage lots. Current demand continues to run chiefly to iron scrap. Prices are unchanged.

New Steel Prices Now Prevail in Eastern Pennsylvania

Virtually All Lower Priced Business Has Been Rolled—Railroad Electrification May Be Continued

PHILADELPHIA, April 18.—No important changes in market conditions have taken place in this district the past week. Operations continue to lag at about 15 per cent, and have been unaffected by the small orders that have come to the mills. These orders have just about balanced rollings that have been completed. Some of the bookings represent protection against business at old prices. This tonnage now is almost entirely off the books, so that operations are more widely on orders at the new levels.

No automotive business of material proportions has come to this district. This is proving a source of disappointment and is a primary factor in holding down operations of both rolling mills and body builders to a low point.

The Pennsylvania Railroad has inquired of steel mills as to the effect on their labor if that carrier is enabled to place tonnages for continuing its electrification work between New York and Washington. It is assumed the Pennsylvania desires the data to support its application for a loan of \$55,000,000 from the Reconstruction Finance Corporation. If the loan is approved by the Interstate Commerce Commission the Pennsylvania will add \$13,000,000 from its own treasury and expend \$68,000,000 on the work. It will call for 60,000 tons of steel.

Pig Iron

The steamship Lennuk arrived at this port Sunday with 3760 tons of English iron, coming from Immingham, England. It is reported the iron is a portion of about 20,000 tons of foreign iron for a Delaware River cast iron pipe maker. Domestic shipments are extremely few and are confined to carloads. There are numerous reports as to a widespread difference between the prices of foreign and American iron, but the foreign quotations are difficult to verify.

Plates, Shapes and Bars

Mills have received a few new orders, as well as specifications against old contracts. The latter are practically all covered, leaving the new price level of 1.60c., base Pittsburgh, as the figure at which virtually all tonnage is being taken. Passaic, N. J., has put out an inquiry for a pipe job calling for about 2500 tons of plates. The new Post Office Department building in Washington will require about 9000 tons of structural steel. Makers report that they are

holding well to the new second quarter prices.

Sheets

Practically all sheet mills made a bid equivalent to the new price of 2.40c., Pittsburgh, on No. 28 tin mill black sheets for 200 tons of steel for license tags for North Carolina. The specifications used the old form, calling for No. 24 deep-drawn pickled one-pass cold-rolled and reannealed sheets. The sheet mill quotations were in almost all instances 3.20c., f.o.b. Raleigh, with $\frac{1}{2}$ per cent discount for cash. One mill, a maker of strip steel, quoted 2.75c., Raleigh, with a discount of 2 per cent, but it is said it does not compete with specifications

on which other mills bid. One jobber quoted 3.15c., Raleigh. No new business has come to this district from automobile manufacturers.

Warehouse

Distributors handling purely seasonal goods report a moderate improvement in orders. Warehouses having a complete line of material report that there is virtually no change in demand. Prices are unchanged.

Imports

Imports last week included 103 tons of pig iron from British India, 33 tons of steel bars from France and 18 tons from Belgium, 190 tons of structural shapes from Belgium and 12 tons from France, 5 tons of steel bands from Belgium, 529 tons of manganese ore from Dutch East Indies and 4 tons from Germany, and 25 tons of tungsten ore from China.

Old Material

A few releases have been made by mills, but involve only light tonnages. The market continues to soften. Machine shop turnings, heavy breakable cast and No. 1 cast are down 50c.

Blast Furnaces and Open Hearths Put On as Ensley Rail Mill Resumes

BIRMINGHAM, April 19.—Pig iron orders and shipments are barely maintaining the March volume and market conditions are unchanged. The quotation of \$11 for the Southern market is firm. There is small prospect of immediate improvement unless pipe plants book orders in excess of present expectations. Three Ensley furnaces of the Tennessee company resumed operations last week in preparation for the reopening of the rail mill. These were Ensley No. 3, No. 4 and No. 6, which had been banked when the rail mill was closed on March 2. With this increase there are now seven active stacks in Alabama.

Steel

The Ensley rail mill of the Tennessee company resumed work on Monday. Four to five open-hearths are also to be operated at Ensley this week. At Fairfield four open-hearths are still active. The open-hearth plant of the Gulf States Steel Co. was idle last week and will continue inactive this week. Current bookings of finished steel have varied little within the past three weeks. The April total is close to that of March for the same periods to date. Ingalls Iron Works, previously reported as low bidder on a dredge for the United States Engineer at Galveston, Tex., has started fabricating steel for the vessel. About 600 tons will be required. Assembly is to be made at Mobile.

Old Material

New buying has practically disappeared and dealers are marking time. Shipments on contracts are at a minimum.

Pig Iron and Scrap Are Dull in New England

BOSTON, April 19.—The pig iron market is still in the doldrums, aggregate sales in the past week having fallen well below 500 tons. The Chapman Valve Co., which had been asking for prices on a round tonnage, has withdrawn from the market, and there is no other prospective business of importance. Dutch iron is offered at \$16 to \$16.25 a ton, duty paid, delivered, that quotation being \$1 a ton or more below levels early in the year.

Old Material

Current business is confined largely to sales of scattered carlots of textile cast to the Warren Foundry & Pipe Corp. at \$7 to \$7.50 a ton, delivered, bundled skeleton and No. 1 heavy melting steel to the American Steel & Wire Co., Worcester, Mass., and steel turnings to Pittsburgh consumers. A majority of brokers are not selling a pound of scrap.

Steel and Pig Iron Business at Dead Level in New York

No Improvement Has Occurred This Month—Sales of Some Steel Products Have Declined

NEW YORK, April 19.—Thus far in April there has been no improvement in either steel or pig iron trade in the New York territory. Business is virtually at a dead level. In some steel products orders have not been as large in the aggregate as in the corresponding period of March. This may be due, in part, to the fact that a good many buyers specified their April requirements at the end of March against expiring first quarter contracts, and they have not had to come into the market again.

Relatively few sales have been made at the higher prices which have been in effect this quarter on bars, plates, shapes, sheets and strip. Although second quarter contracts were made, specifications against these contracts have scarcely begun. Unless business improves during the next few weeks, the real test of the new prices will be postponed until some time in May. Shipments against first quarter contracts will be made up to the last day of April, and these shipments will take care of the requirements of many consumers and jobbers through at least part of next month.

The dearth of new building construction in New York and vicinity serves to keep steel demand low here, as building work normally enters into the steel consumption of this territory to a very marked extent. Demand for concrete reinforcing bars has been declining at a time when seasonal expansion usually occurs. In structural steel a few more private projects are coming up for bids, but the work is all small.

There has been some misunderstanding in the export trade as to the orders for the pipe for the Irak oil line, to be built from Persia to the Mediterranean. It now appears that American mills will obtain not more than 16,000 tons of pipe for this project, last week's published estimate of 90,000 tons having been incorrect.

Structural steel awards in the metropolitan area during March, as compiled by the Structural Steel Board of Trade, totaled only 805 tons, the lowest figure for any month since the records were begun in 1925. This total is exclusive of bridges, subways and similar engineering work. The February total was 4870 tons.

Pig Iron

The A. P. Smith Mfg. Co., East Orange, N. J., has closed against its inquiry for 200 tons of foundry iron for May-June delivery, having bought

Continental iron. Pig iron sales for the week, at 2000 tons, compare with 1500 tons in the preceding week and 2000 tons two weeks ago. Demand shows no perceptible improvement. Melters prefer to buy in small lots, sometimes in truckloads, rather than to pile an extra ton of iron. Continental iron continues to dominate this market. Quotations of as low as \$13, duty paid, alongside Brooklyn dock and \$14.30, ex ship, New Jersey port, have been reported. However, higher prices are said to be in prospect, owing to the increased cost of ore occasioned by the rise in sterling. Several melters are known to have taken part of the 1200-ton cargo which recently arrived at Hoboken. The opening of the State barge canal on April 15 aroused little interest, in view of sizable stocks of domestic iron still undisposed of at Jersey City and Elizabethport.

Old Material

Scrap trading has come almost to a standstill. One prominent broker is neither buying nor selling. Although the market has been dull for many months, it has not heretofore come so close to the point of stagnation. The shutting down of the Bayonne, N. J., plant of the American Radiator Co. has left virtually no market for stove plate scrap, which has weakened in price.

Republic Puts in Four Open-Hearths at Buffalo

BUFFALO, April 19.—Pig iron business is almost at a standstill. Shipping directions are for meager amounts and new business is limited to carload lots. Five blast furnaces are active.

Old Material

There is considerable demand among dealers for borings and turnings for delivery to a blast furnace here, with as high as \$6.25 being paid. The principal consumer here is taking a carload of No. 1 or No. 2 heavy melting steel a week from each dealer having a commitment. This consumer is understood to be offering \$5.50 for No. 1 steel, f.o.b. barge, New York.

Finished Steel

The Lackawanna plant of the Bethlehem Steel Corp. is still running nine open-hearth furnaces. Effective

Saturday, Republic Steel Corp. placed four open-hearths in operation, and these are expected to continue active throughout the week. Seneca Iron & Steel Co. is operating at 20 to 25 per cent. Two boiler houses at Passaic, N. J., require 800 tons of structural steel which will be fabricated in Buffalo. The same fabricator has taken 100 tons additional of structural steel for Port of Albany improvements.

Sheet Demand Improves at Cincinnati

CINCINNATI, April 19.—New business in pig iron during the past week totaled just a little more than 600 tons. Shipments are still retarded and, in some instances, material ordered for the first half of 1931 is still due on contract. Melt is at a low level, and no prospect of early improvement is seen. An inquiry from an Indiana melter for 1000 tons of malleable iron is current.

Finished Material

Sheet releases from automobile parts makers have increased slightly. Bookings from refrigeration companies continue at a good level, but the usual seasonal improvement in road construction demand is retarded. Production continues to hover near 40 per cent of capacity.

Old Material

Except for shipments of small amounts of clippings, turnings and blast furnace scrap on contract, the scrap market is dull. Dealers are not laying down scrap except at low prices.

Scrap Loses Strength at Detroit

DETROIT, April 19.—With a revival of consumer buying apparently as far distant as it was a week ago, the local scrap market has lost strength, and long turnings, No. 1 busheling and sheet clips are down 25c. a ton. A boat load of scrap is reported leaving this week for Cleveland, where it will be shipped by rail to the Youngstown district.

Pipe Lines

California-Texas Leasing Co., Los Angeles, care of James F. Sadler, 810 1/2 South New Hampshire Avenue, affiliated with Presidio Petroleum Co., Presidio, Tex., H. W. Rowe, Midland, Tex., in charge, plans crude oil pipe line from point near Midland to Topolobampo, Sinaloa, Mexico, with branch line to Chihuahua City, Chihuahua, Mexico, and vicinity, about 600 miles.

Board of Supervisors, Los Angeles, is considering report from J. E. Rockhold, County surveyor, for 30-in. steel pipe line for transportation of reclaimed sewage effluent from city to different citrus fruit districts in San Gabriel Valley section, about 31 miles, pipe to be of 1/4 and 5/16-in. shell thickness. Cost about \$1,000,890. Project also will include four main motor-driven pumping plants to cost about \$135,500 with machinery.

William A. Irvin Formally Elected President of Steel Corporation

DIRECTORS of the United States Steel Corp. on Tuesday formally ratified the selection of William A. Irvin as president to succeed James A. Farrell, whose retirement became effective on that day. The formal election of Henry L. Austin as comptroller to succeed William J. Filbert, who was recently made vice-chairman of the finance committee, also took place. The full slate of officers as elected or reelected at the board of directors organization meeting follows:

Myron C. Taylor, chairman of the board and chairman of the finance committee.

William J. Filbert, vice-chairman finance committee.

George F. Baker, member finance committee.

William A. Irvin, president.

Nathan L. Miller, general counsel.

Gordon L. Edwards, treasurer.

George K. Leet, secretary.

Henry L. Austin, comptroller.

James A. Farrell, retiring president, will be the guest of honor of the American Iron and Steel Institute at a dinner tonight (Thursday) at the Waldorf-Astoria Hotel, New York. Mr. Farrell has been vice-president of the institute for a number of years.

Charles M. Schwab, president of the institute, will be toastmaster. The speakers will be Myron C. Taylor; H. W. Phelps, president, American Can Co.; E. J. Buffington, president, Illinois Steel Co., and George Gordon Crawford, president, Jones & Laughlin Steel Corp.

Mr. Farrell will leave Saturday for Honolulu, where he will preside at the annual meeting of the National Foreign Trade Council.

Fabricated Structural Steel

TOTAL lettings the past week, which were among the smallest of the year, call for only 7500 tons. The largest booking was 2000 tons for an exhibition hall in Cleveland. Bridge awards in various sections of the country account for 3500 tons. New inquiries total 8050 tons. The Hoover Dam project will require 2500 tons for gates and other equipment. Awards follow:

NORTH ATLANTIC STATES

Anson, Me., 125 tons, State bridge, to Lackawanna Steel Construction Corp.

Elmira, N. Y., 150 tons, reformatory, to American Bridge Co.

New York, 140 tons, alterations to Williamsburg Bridge, to Magor Car Corp.

Paramus, N. J., 220 tons, highway bridge, to American Bridge Co.

Philadelphia, 110 tons, addition to Penn Charter School, to Robinson Iron & Steel Co.

Norristown, Pa., 110 tons, Reading Co. passenger station, to Modern Iron Works.

Ithaca, N. Y., 150 tons, truss bridge, to Lackawanna Steel Construction Corp.

Road Bridge, Md., 150 tons, Kidd's School, to American Bridge Co.

THE SOUTH

Texarkana, Tex., 910 tons, post office, to Petroleum Iron Works.

CENTRAL STATES

Cleveland, 2000 tons, exhibition hall, to American Bridge Co.

Wickliffe, Ohio, 105 tons, high school addition; reawarded to Burger Iron Co.

Columbus, Ind., 240 tons, highway bridge, to Central States Bridge & Structural Co.

Hammond, Ind., 140 tons, soap factory, to Hansell-Elcock Foundry Co.

Central City, Neb., 400 tons, bridge, to Pittsburgh-Des Moines Steel Co.

Collins, Mo., 265 tons, highway bridge, to St. Joseph Structural Steel Co.

WESTERN STATES

Anaconda, Mont., 100 tons, bridge, to Pittsburgh-Des Moines Steel Co.

Gladstone, Ore., 900 tons, Clackamas River State highway bridge, to Poole & McGonigle.

Long Beach, Cal., 260 tons, bridge for Pacific Electric Railway, to Consolidated Steel Corp.

Fairbanks, Alaska, 350 tons, post office, to McClintic-Marshall Corp.

CANADA

Winnipeg, Man., 700 tons, Salter Street bridge, to Dominion Bridge Co.

Kitchener, Ont., 200 tons, public utilities building, to Hamilton Bridge Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Thomaston, Conn., 300 tons, State bridge.

Boston, 250 tons, Arlington Street bridge.

New Bedford, Mass., 125 tons, St. Joseph's church.

Seranton, Pa., 2000 tons, West Seranton Junior High School; previously reported as 1000 tons, bids to be opened May 7.

Washington, 8000 tons, addition to post office, bids to be opened May 23.

Washington, 9000 tons, Department of Justice Building; bids to be opened May 31.

THE SOUTH

Memphis, Tenn., 350 tons, steel concrete forms for United States Engineer's office.

Longview, Tex., 300 tons, court house, new bids asked.

CENTRAL STATES

Milan, Mich., 400 tons, Federal jail.

Chippewa Falls, Wis., 1000 tons, State highway bridge; bids close April 26.

State of Iowa, 425 tons, bridges.

State of Indiana, 350 tons, highway bridges.

St. Louis, 950 tons, two bridges over Des Peres River at Wellington Avenue, for St. Louis-San Francisco Railroad and city of St. Louis.

WESTERN STATES

Hoover Dam, Nev., 2500 tons, bulk head gates and stony gates and hoists.

Gorman, Cal., 100 tons, three State highway bridges; bids close May 4.

FABRICATED PLATE

AWARDS

Denver, 100 tons, tanks for Midland Oil Refining Co., to Sterns-Rogers Mfg. Co.

Detroit, 400 tons, dredge hull for Dunbar & Sullivan Dredging Co. and tug for Ford Motor Co., to Great Lakes Engineering Works.

NEW PROJECTS

Cleveland, 275 tons, two municipal tanks.

Reinforcing Steel

Awards 2125 Tons—New Projects 2820 Tons

AWARDS

State of Maine, 125 tons, nine State bridges, to Bancroft & Martin Rolling Mill Co.

Missoula, Mont., 108 tons, high school, to Pacific Coast Steel Co.

Los Angeles, 150 tons, Venice Boulevard bridge, to Blue Diamond Corp.

Okanogan, Wash., 282 tons, State highway structures, to Northwest Steel Rolling Mills, Inc.

State of Washington, 130 tons, paving projects, to Pacific Coast Steel Co.

Geyserville, Cal., 122 tons, Russian River County bridge, to Soule Steel Co.

San Francisco, 330 tons, Sacred Heart College, first unit, to W. S. Wetenhall Co.

Sacramento, 570 tons, post office, to an unnamed bidder.

San Francisco, 300 tons, Pier No. 92 shed, to Soule Steel Co.

NEW REINFORCING BAR PROJECTS

Brooklyn, 500 tons, sewer in Avenue M; Russell Contracting Co., Brooklyn, low bidder.

Washington, 1100 tons, addition to post office, through typographical error, figure last week read 100 tons, B-W Construction Co., Chicago, general contractor.

Akron, Ohio, 500 tons, building for Quaker Oats Co.

Norwalk, Ohio, 200 tons, sewage disposal plant.

Shreveport, La., 135 tons, barracks for Barksdale air field.

Riverside County, Cal., 216 tons, State highway structures, United Concrete Pipe Co. low on general contract.

Oakland, Cal., 150 tons, El Dorado Oil Co. plant.

State of Oregon, 113 tons, highway structures in Baker and Douglas counties, bids close April 28.

Sheet Shipments Gained in March

Shipments of steel sheets gained slightly in March over February, but sales, production and unfilled orders declined, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers composed of independent producers.

	March	February	January
Sales	101,559	108,441	121,258
Production	110,559	124,157	110,921
Shipments	117,685	116,715	112,971
Unfilled orders	102,171	118,022	126,508
Unshipped orders	55,331	51,485	45,748
Unsold stocks	68,677	72,857	73,540
Capacity per month	555,000	555,000	555,000
Percentage reporting	68.7	68.7	68.7

Percentages, Based on Capacity			
Sales	26.6	28.4	31.8
Production	29.0	32.5	31.2
Shipments	30.8	30.6	29.6
Unfilled orders	26.8	30.9	33.2
Unshipped orders	14.5	13.5	12.0
Unsold stocks	18.0	19.1	19.3

Copper Dull and Weak; Tin at New Low; Zinc Declines; Lead Steady

NEW YORK, April 19.—The copper market continues both dull and weak. The nominal price of primary producers for electrolytic copper is 6c. a lb., delivered Connecticut Valley, but the metal is available from custom smelters at 5.75c., with few buyers. The official price for export is 6.25c. a lb., delivered European ports, but special offers are being made at 6.12½c. Export business, as well as domestic business, remains very quiet. Export sales thus far in April total 6040 net tons, and it is believed that considerable will have to be bought by foreign users for April and May, but no inquiries of importance have appeared. Today's foreign buying was only 40 tons. Lake copper is unchanged at 6c. to 6.12½c. a lb., delivered.

Tin

Straits tin in New York has declined to the lowest levels since 1898. The market has been unsettled during the past week, having been sharply affected by the trend of securities. Although London prices are higher than a week ago, the New York market developed only slight strengthening. The low point was Thursday, April 14, when the quotation was

18.30c. a lb. On the preceding day a large automobile manufacturer purchased a moderate amount at 18.37½c. The price here gained slightly last Friday and again on Monday and today. Today's price was 19c. London prices today were £106 7s. 6d. for spot standard, £108 12s. 6d. for future standard, and £110 7s. 6d. for spot Straits. The Singapore price was £111 10s. United Kingdom warehouse stocks are reported at 32,767 tons, a decline of 343 tons. Shipments from the Straits up to the 15th of this month were 3063 tons.

Lead

While the demand has not materially increased, the market is steady. Sellers sense a somewhat more hopeful feeling among some of their customers. The statistical position is improving. Stocks on March 31 were 169,091 tons, and, while this was an increase of about 3100 tons over the Feb. 29 figure, the increase was 2500 tons less than the increase in February, which, in turn, had been 3200 tons less than the January increase. This approach to a closer balance between supply and demand, which is the result of the curtailment program, encourages the trade to expect

a healthier market. Operation of the St. Joseph Lead Co.'s smelter at Herculaneum, Mo., will be suspended May 1 until next fall, which will reduce production by 3000 to 4000 tons a month. Prices continue unchanged and firm at 2.90c. a lb., St. Louis, and 3c., New York.

Zinc

There are few buyers, so the zinc market remains very dull. While the price of some producers is nominally unchanged at 2.90c., no business can be done at this figure. Most of the recent transactions have been at 2.75c. to 2.80c. a lb., East St. Louis. Shipments of ore from Joplin last week were 2805 tons, a decline of about 900 tons from the previous week's total, but sales, at 2860 tons, were a little larger than in the week before. Joplin ore remains steady at \$16 to \$17 a ton.

CHICAGO, April 18.—On April 1, unfilled orders for brass and bronze ingots and billets on the books of the members of the Non-Ferrous Ingot Metal Institute amounted to a total of 19,245 tons.

The Week's Prices. Cents Per Pound for Early Delivery

	Apr. 13	Apr. 14	Apr. 15	Apr. 16	Apr. 18	Apr. 19
Lake copper, New York.....	6.00	6.00	6.00	6.00	6.00	6.00
Electrolytic copper, N. Y.*.....	5.50	5.50	5.50	5.50	5.50	5.50
Straits tin, spot, N. Y.*.....	18.37½	18.30	18.60	18.87½	19.00	19.00
Zinc, East St. Louis.....	2.80	2.75	2.75	2.75	2.75	2.75
Zinc, New York.....	3.17	3.12	3.12	3.12	3.12	3.12
Lead, St. Louis.....	2.90	2.90	2.90	2.90	2.90	2.90
Lead, New York.....	3.00	3.00	3.00	3.00	3.00	3.00

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Aluminum, 98 to 99 per cent pure, 22.50c. a lb., delivered.
Nickel, electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 5.87½c. a lb., New York.
Brass ingots, 85-5-5-5, 6.12½c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig.....	21.50c. to 22.50c.
Tin, bar.....	23.50c. to 25.50c.
Copper, Lake.....	8.00c. to 9.00c.
Copper, electrolytic.....	7.75c. to 8.75c.
Copper, casting.....	7.50c. to 8.50c.
*Copper sheets, hot-rolled.....	15.37½c.
*High brass sheets.....	12.50c.
*Seamless brass tubes.....	15.75c.
*Seamless copper tubes.....	14.87½c.
*Brass rods.....	10.25c.
*Braze brass tubes.....	21.62½c.
Zinc, slab.....	4.00c. to 4.50c.
Zinc sheets (No. 9), casks.....	9.25c. to 9.50c.
Lead, American pig.....	4.00c. to 4.50c.
Lead, bar.....	5.75c. to 6.75c.
Lead sheets.....	7.50c.
Antimony, Asiatic.....	9.00c. to 10.00c.
Alum., virgin, 99 per cent plus.....	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent.....	17.00c. to 18.00c.
Solder, ½ and ½.....	14.75c. to 15.75c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

Metals from Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig.....	24.00c.
Tin, bar.....	26.00c.

Copper, Lake.....	7.00c.
Copper, electrolytic.....	7.00c.
Copper, casting.....	6.75c.
Zinc, slab.....	4.25c. to 4.50c.
Lead, American pig.....	3.75c. to 4.00c.
Lead, bar.....	7.25c.
Antimony, Asiatic.....	10.00c.
Babbitt metal, medium grade.....	14.50c.
Babbitt metal, high grade.....	28.00c.
Solder, ½ and ½.....	16.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	4.25c.	5.00c.
Copper, hvy. and wire	4.00c.	4.75c.
Copper, light and bottoms.....	3.25c.	4.00c.
Brass, heavy.....	2.25c.	2.75c.
Brass, light.....	1.75c.	2.50c.
Hvy. machine composition.....	3.25c.	3.75c.
No. 1 yel. brass turnings.....	2.25c.	2.75c.
No. 1 red brass or compos. turnings.....	2.75c.	3.25c.
Lead, heavy.....	2.00c.	2.50c.
Zinc.....	1.00c.	1.50c.
Cast aluminum.....	3.50c.	5.00c.
Sheet aluminum.....	8.50c.	10.50c.

Cast Iron Pipe

Wingdale, N. Y., is in the market for 300 tons.

Cedar Grove, Wis., has placed 7000 lin. ft. of 8-in. and 7555 lin. ft. of 6-in. class C water pipe and 26 hydrants with James B. Clow & Sons.

St. Louis awarded about 225 tons of 8-, 10- and 12-inch pipe to American Cast Iron Pipe Co., 160 tons to National Cast Iron Pipe Co., and 100 tons to McWane Cast Iron Pipe Co.

St. Louis has divided 20,000 ft. 8-in. and 10,000 ft. 6-in., among several bidders.

Los Angeles opened bids April 15 on 5000 tons and four Birmingham plants are reported low bidders on part.

Seattle and the State of Washington jointly awarded 142 tons of 8-in. to Pacific Northwest Supply Co. (French pipe), in connection with improvements on Aurora Avenue.

Kittitas, Wash., received no bids on 112 tons of 4- and 6-in., advertised to be opened on April 8, and project will be readvertised.

San Diego opened bids on general contract for the El Capitan dam, including 400 tons of cast iron pipe in the specifications. T. E. Connolly, San Francisco and H. W. Rohl, Los Angeles are low bidders on a combined bid.

La Habra, Cal., voted favorably on a water system bond issue which will require 800 tons of 4- to 12-in.

Great Falls, Mont., awarded 75 tons of 6-in. to Pacific States Cast Iron Pipe Co.

Yakima, Wash., awarded 1436 tons of 16 to 24-in., to R. D. Wood Co.

Los Angeles opened bids on about 5000 tons of 8 and 12 in. on April 14. Low bidders were: United States Pipe & Foundry Co. on 2540 tons of 8- and 12-in.; American Cast Iron Pipe Co. on 1160 tons of 8- and 12-in.; National Cast Iron Pipe Co. on 775 tons of 8-in.; Pacific States Cast Iron Pipe Co. on 550 tons of 8-in.

Bremerton, Wash., will open bids April 18 on 210 tons for Marine Water District.

Chehalis, Wash., awarded 75 tons of 4- and 6-in., to Pacific States Cast Iron Pipe Co.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.60c.
F.o.b. Chicago.....	1.70c.
Del'd Philadelphia.....	1.91c.
Del'd New York.....	1.95c.
Del'd Detroit.....	1.85c.
F.o.b. Cleveland.....	1.65c.
F.o.b. Lackawanna.....	1.70c.
F.o.b. Birmingham.....	1.75c.
C.I.F. Pacific ports.....	2.00c.

Billet Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.....	1.50c. to 1.60c.
F.o.b. Birmingham, mill lengths.....	1.75c.
F.o.b. Cleveland.....	1.50c.

Roll Steel

F.o.b. mills, east of Chicago dist.....	1.30c. to 1.35c.
F.o.b. Chicago Heights mills.....	1.50c. to 1.60c.
Del'd Philadelphia.....	1.49c. to 1.59c.

Iron

Common iron, f.o.b. Chicago.....	1.70c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.11c.
Common iron, del'd New York.....	2.15c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.60c.
F.o.b. Chicago.....	1.70c.
F.o.b. Birmingham.....	1.75c.
Del'd Cleveland.....	1.8035c.
Del'd Philadelphia.....	1.7935c.
F.o.b. Coatesville.....	1.70c.
F.o.b. Sparrows Point.....	1.70c.
F.o.b. Lackawanna.....	1.70c.
Del'd New York.....	1.89c.
C.I.F. Pacific ports.....	1.85c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.60c.
F.o.b. Birmingham.....	1.75c.
F.o.b. Lackawanna.....	1.70c.
F.o.b. Bethlehem.....	1.70c.
Del'd Cleveland.....	1.8035c.
Del'd Philadelphia.....	1.6495c.
Del'd New York.....	1.86775c.
C.I.F. Pacific ports (standard).....	2.00c.
C.I.F. Pacific ports (wide flange).....	2.10c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh.....	1.90c.
F.o.b. Chicago mill.....	2.05c.
F.o.b. Buffalo.....	2.00c.

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.	Alloy Differential per 100 Lb.
S.A.E. Series	
2100 (1 1/2% Nickel)	0.55
2300 (3 1/2% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.50
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.16 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel.....	0.20
6100 Chromium Vanadium Bar.....	1.20
6100 Chromium Vanadium Spring Steel.....	0.95
9250 Silicon Manganese Spring Steel (flat).....	0.25
Rounds and squares.....	0.50
Chromium Nickel Vanadium.....	1.50
Carbon Vanadium.....	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is 3/4c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with section area of less than 16 in. or less than 2 1/2 in. thick, regardless of sectional area, take the bar price.

Cold-Finished Bars

	Base per Lb.
Bars, f.o.b. Pittsburgh mill.....	2.00c.
Bars, f.o.b. Chicago.....	2.00c.
Bars, Cleveland.....	1.90c. to 2.00c.
Bars, Buffalo.....	2.00c.
Shaping, ground, f.o.b. mill.....	2.35c. to 3.30c.

*According to size.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot-rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh.....	1.55c.
No. 10, f.o.b. Chicago mill.....	1.65c.
No. 10, del'd Philadelphia.....	1.86c.
No. 10, f.o.b. Birmingham.....	1.70c.
No. 10, c.I.F. Pacific Coast ports.....	2.30c.

Hot-Rolled and Annealed

No. 10, Pittsburgh.....	1.70c.
No. 10, Chicago mills.....	1.80c.
No. 10, Birmingham.....	1.85c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh.....	2.20c.
No. 24, f.o.b. Chicago mills.....	2.30c.
No. 24, del'd Philadelphia.....	2.46c. to 2.51c.
No. 24, f.o.b. Birmingham.....	2.35c. to 2.40c.
No. 24, c.I.F. Pacific Coast ports.....	2.85c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh.....	2.25c.
No. 10 gage, f.o.b. Chicago mills.....	2.35c.
No. 10 gage, del'd Philadelphia.....	2.46c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh.....	2.75c.
No. 20 gage, f.o.b. Chicago mills.....	2.85c.
No. 20 gage, del'd Philadelphia.....	3.06c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	2.90c.
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Steel Furniture Sheets

No. 10, f.o.b. Pittsburgh.....	2.65c.
No. 20, f.o.b. Pittsburgh.....	3.15c.

(Prices on furniture stock include stretcher leveling but not resquaring.)

Galvanized Sheets

No. 24, f.o.b. Pittsburgh.....	2.85c.
No. 24, f.o.b. Chicago mills.....	2.95c.
No. 24, del'd Philadelphia.....	3.16c.
No. 24, f.o.b. Birmingham.....	3.00c.
No. 24, c.I.F. Pacific Coast ports.....	3.50c.

Long Terns

No. 21, unassorted, 8-lb coating, f.o.b. P'gh.....	2.90c. to 3.00c.
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Vitreous Enameling Stock

No. 10, f.o.b. Pittsburgh.....	2.60c.
No. 20, f.o.b. Pittsburgh.....	3.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.40c. to 2.50c.
No. 28, Chicago mill.....	2.50c. to 2.60c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mills.....	\$4.75
Standard cokes, f.o.b. Gary.....	4.85

Terne Plate

	(F.o.b. Morganloun or Pittsburgh)
(Per Package, 20 x 28 in.)	
8-lb. coating I.C.	\$9.50
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.10
30-lb. coating I.C.	14.90
40-lb. coating I.C.	16.70

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, Pittsburgh.....	1.50c. to 1.60c.
Wider than 6 in., P'gh.....	1.40c. to 1.50c.
6 in. and narrower, Chicago.....	1.60c. to 1.70c.
Wider than 6 in., Chicago.....	1.50c. to 1.60c.
Cooperage stock, P'gh.....	1.60c. to 1.70c.
Cooperage stock, Chicago.....	1.70c. to 1.80c.

Cold-Rolled Strips

F.o.b. Pittsburgh.....	2.00c.
F.o.b. Cleveland.....	2.00c.
Del'd Chicago.....	2.30c.
F.o.b. Worcester.....	2.20c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland.....	3.00c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)
(After Dec. 31, extras of 10c. a 100 lb. on mixed and joint carloads, 25c. on pool carloads and 40c. on less than carloads will be applied on all merchant wire products.)

To Manufacturing Trade

Bright wire.....	2.20c.
Spring wire.....	3.20c.

To Jobbing Trade

	Base per Kilo
Standard wire nails.....	\$1.95
Smooth coated nails.....	1.95
Galvanized nails.....	3.95

Base per Lb.

Smooth annealed wire.....	2.35c.
Smooth galvanized wire.....	2.80c.
Polished staples.....	2.50c.
Galvanized staples.....	2.75c.

Barbed wire, galvanized.....2.60c.

Woven wire fence, No. 9 gage, per net ton.....\$55.00

lighter, per net ton.....60.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.

STEEL PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Black	Galv.	Inches	Black	Galv.
1/4	47	21 1/2	3 1/2	25	7
1/2	53	27 1/2	4	30	13
3/4	58	44 1/2	5	31	17
1	62	50 1/2	6	31	20
1 1/4	64	52 1/2	8	31	20

Lap Weld

2	57	45 1/2	2	25	11
2 1/2	61	49 1/2	2 1/2	30	15
3	58	45 1/2	4	32	19
3 1/2	56	43 1/2	7 and 8	31	18
4	55	42 1/2	10 and 12	28	13

Butt Weld, extra strong, plain ends

1/4	43	26 1/2	1 1/2 and 1 3/4	11	46
1/2	49	32 1/2	2	25	9
3/4	55	44 1/2	3	30	14
1	60	49 1/2	4	36	20
1 1/4	62	51 1/2			
1 1/2	63	52 1/2			

Lap Weld, extra strong, plain ends

2	55	44 1/2	2	31	15
2 1/2	59	48 1/2	2 1/2	36	22
3	58	47 1/2	3	35	21
3 1/2	54	41 1/2	4	33	19
4	54	41 1/2	6	33	19
4 1/2	54	41 1/2	8	33	19

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discounts of 5 and 2 1/2%, and on galvanized by 1 1/2 points with supplementary discounts of 5 and 2 1/2%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2 1/2%.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel	Charcoal Iron
2 in. and 2 1/2	1 1/2 in. 1
3 in. 38	1 3/4 in. 8
3 1/2 in. 46	2 in. 13
4 in. 52	2 1/2 in. 16
4 1/2 in. 54	3 in. 17
5 in. 57	3 1/2 in. 18
5 1/2 in. 57	4 in. 20
6 in. 57	4 1/2 in. 21

On lots of a carload or more, the above base discounts are subject to a preferential of two fires on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one fire; 10,000 lb. to carload, 4 points under base and two fires. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one fire.

Standard Commercial Seamless Boiler Tubes

Cold-Drawn	Hot Rolled
1 in. 61	3 in. 46
1 1/4 in. 53	3 1/2 in. 48
1 1/2 in. 57	4 in. 51
2 in. 52	4 1/2 in. 5 and 6
2 1/2 in. 49	5 in. 40

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads) 50
Carbon, 0.30% to 0.40% base (carloads) 50
Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

Rails

	Per Gross Ton
Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	34.00
Light (from rail steel), f.o.b. mill.....	32.00

Track Equipment

	Base per 100 Lb.
Spikes, 9/16-in. and larger.....	\$2.60
Spikes, 1/2-in. and larger.....	2.60
Spikes, boat and barge.....	2.80
Tie plate, steel.....	1.85
Angle bars.....	2.75
Track bolts, to steam railroads.....	3.50
Track bolts, to jobbers, all sizes, per 100 count.....	73 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts.....	75
Carriage bolts.....	75
Lag bolts.....	75
Flow bolts, Nos. 1, 2, 3 and 7 heads.....	75
Hot-pressed nuts, blank or tapped, square.....	75
Hot-pressed nuts, blank or tapped, hexagons.....	75
C.p.c. and t. square or hex. nuts, blank or tapped.....	75
Washers.....	75

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including 1/2 in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts.....	75
Semi-finished hexagon castellated nuts, S.A.E.	75
Store bolts in packages, P'gh.....	85 and 10
Store bolts in packages, Chicago.....	85 and 10
Store bolts in pkgs., Cleveland.....	85 and 10
Store bolts in bulk, P'gh.....	85, 10 and 2 1/2
Store bolts in bulk, Chicago.....	85, 10 and 2 1/2
Store bolts in b'k., Cleveland.....	85, 10 and 2 1/2
Tire bolts.....	60 and 10

Discount of 75 per cent off on bolts and nuts applies on carload business with jobbers and large consumers.

Large Rivets

(1/2-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland.....	\$2.25
F.o.b. Chicago.....	70, 10 and 5

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh.....	70, 10 and 5
F.o.b. Cleveland.....	70, 10 and 5
F.o.b. Chicago.....	70, 10 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws.....	80, 10, 10 and 5
Milled standard set screws, case hard-ened.....	80 and 5
Milled headless set screws, cut thread.....	75 and 10
Upset hex. head cap screws, U.S.S.	80, 10 and 10
Upset hex. cap screws, S.A.E. thread.....	85, 10 and 10
Upset set screws.....	80, 10 and 5
Milled studs.....	70

SEMI-FINISHED STEEL

Billets and Blooms

	Per Gross Ton
Re-rolling, 4-in. and under.....	\$26.00 to \$27.00
Re-rolling, 4-in. and under.....	26.00 to 27.00
Re-rolling, 4-in. and under.....	26.00
Re-rolling, 4-in. and under.....	29.00
Forging quality, Pittsburgh.....	33.00 to 34.00
Forging quality, Youngstown.....	33.00

Sheet Bars

(Open-Hearth or Bessemer)

	Per Gross Ton
Pittsburgh.....	\$26.00
Youngstown.....	2

Skeps	
(F.o.b. Pittsburgh or Youngstown)	
	Per Lb.
Grooved	1.50c. to 1.60c.
Universal	1.50c. to 1.60c.
Sheared	1.50c. to 1.60c.

Wire Rods	
(Common soft, base)	
	Per Gross Ton
Pittsburgh	\$37.00
Cleveland	37.00
Chicago	38.00

COKE, COAL AND FUEL OIL

Coke	
	Per Net Ton
Furnace, f.o.b. Connellsville	\$2.25
Foundry, f.o.b. Connellsville	\$3.25 to 4.50
Foundry, by-product, Chicago	7.50
Foundry, by-product, New England, delivered	10.50
Foundry, by-product, Newark or Jersey City, del'd.	8.70 to 9.10
Foundry, by-product, Phila. land, delivered	9.00
Foundry, Birmingham	8.27
Foundry, by-products, St. Louis, f.o.b., ovens	5.00
Foundry, by-products, del'd	8.00
St. Louis	9.00

Coal	
	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.50
Mine run coking, coal, f.o.b. W. Pa.	1.50 to 1.60
Gas coal, 8-in., f.o.b. Pa. mines	1.70 to 1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	0.40 to 0.60
Gas slack, f.o.b. W. Pa. mines	0.65 to 0.75

Fuel Oil	
	Per Gal. f.o.b. Bayonne, N. J.
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. f.o.b. Baltimore	
No. 3 distillate	3.50c.
No. 4 industrial	3.25c.
Per Gal. del'd Chicago	
No. 3 industrial fuel oil	2.75c.
No. 5 industrial fuel oil	2.60c.
Per Gal. f.o.b. Cleveland	
No. 3 industrial fuel oil	4.62 1/2c.
No. 4 industrial	3.87 1/2c.

REFRACTORIES

Fire Clay Brick	
	Per 1000 f.o.b. Works
High-heat	Intermediate
Duty Brick	Duty Brick
Penn.	\$38.00 \$25.00 to \$30.00
Maryland	38.00 25.00 to 30.00
New Jer.	\$44.00 to 57.00
Ohio	38.00 25.00 to 30.00
Kentucky	38.00 25.00 to 30.00
Missouri	35.00 30.00
Illinois	38.00 25.00 to 30.00
Ground fire clay, per ton	6.50

Chrome Brick	
	Per Net Ton
Standard size	\$42.50

Silica Brick	
	Per 1000 f.o.b. Works
Pennsylvania	\$58.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick	
	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$61.50
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	38.50
Domestic, f.o.b. Chewelah, Wash.	20.90

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd	
Chicago	\$36.40 to \$38.40
4-in. del'd Chicago	39.40 to 41.40
6-in. and larger, del'd New York	\$28.20
4-in. del'd New York	31.20
6-in. and larger, Birm'ham	\$32.00 to 33.00
4-in. Birmingham	35.00 to 36.00

*Class "A" and gas pipe, \$3 extra.

Pig Iron, Ores, Ferroalloys

VALLEY	
	Per gross ton, f.o.b. Valley furnace:
Basic	\$14.50
Bessemer	15.50
Gray forge	15.00
No. 2 foundry	15.00
No. 3 foundry	14.50
Malleable	15.50
Low phos., copper free	25.00

Freight rate to Pittsburgh or Cleveland district, \$1.89.

PITTSBURGH	
	Per gross ton, f.o.b. Pittsburgh district furnace:
Basic	\$15.00
No. 2 foundry	16.00
No. 3 foundry	15.50
Malleable	16.00
Bessemer	16.00

Freight rates to points in Pittsburgh district range from 60c. to \$1.25.

CHICAGO	
	Per gross ton at Chicago furnace:
N'th'n No. 2 fdy.	\$16.00 to \$16.50
N'th'n No. 1 fdy.	16.50 to 17.93
Malleable, not over 2.25	16.00 to 16.50
sil.	16.00 to 16.50
High phosphorus	16.00 to 16.50
Lake Super. charcoal	
sil. 1.50, by rail	23.17
S'th'n No. 2 fdy.	16.14
Low phos., sil. 1 to 2	
copper free	28.50 to 29.20
Silvery, sil. 8 per cent	23.67
Bess. ferro-silicon, 15 per cent	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

ST. LOUIS	
	Per gross ton at St. Louis:
No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City	\$17.50
Malleable, f.o.b. Granite City	17.50
Northern No. 2 fdy., del'd	\$18.00 to 18.80
St. Louis	14.56
Southern No. 2 fdy., del'd	18.50 to 18.80
Northern malleable, del'd	18.50 to 18.80
Northern basic, del'd	18.50 to 18.80

Freight rates 83c. (average) Granite City to St. Louis; \$2.30 from Chicago; \$4.50 from Birmingham.

NEW YORK	
	Per gross ton, delivered New York district:
*Buffalo, No. 2, del'd	\$17.01 to \$18.41
East. Pa. No. 2 fdy.	16.52 to 17.02
East. Pa. No. 2X fdy.	17.02 to 17.52

Freight rates: \$1.52 to \$2.63 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of \$3.41 a ton from Buffalo.

BUFFALO	
	Per gross ton, f.o.b. furnace:
No. 2 fdy.	\$16.00
No. 2X fdy.	16.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50
Lake Superior charcoal, del'd	23.41

NEW ENGLAND

	Per gross ton delivered to most New England points:
*Buffalo, sil.	1.75 to 2.25, \$19.54 to \$20.04
*Buffalo, sil.	2.25 to 2.75, \$19.54 to \$20.04
*Ala., sil. 1.75 to 2.25	19.74
*Ala., sil. 2.25 to 2.75	20.24
*Ala., sil. 1.75 to 2.25	15.88
*Ala., sil. 2.25 to 2.75	16.28

Freight rates: \$5.04 all rail from Buffalo; \$9.75 all rail from Alabama and \$5.88 rail and water from Alabama to New England seaboard.

*All rail rate.

*Rail and water rate.

CINCINNATI	
	Per gross ton, delivered Cincinnati:
Ala. fdy., sil. 1.75 to 2.25	\$13.82
Tenn. fdy., sil. 1.75 to 2.25	14.32
N'th'n No. 2 foundry	\$17.01 to 17.59
S'th'n Ohio silvery, 8%	21.02

Freight rates, \$2.02 from Ironton and Jackson, Ohio; \$3.82 from Birmingham.

PHILADELPHIA	
	Per gross ton at Philadelphia:
East. Pa. No. 2	\$15.50 to \$16.09
East. Pa. No. 2X	16.09 to 16.59
East. Pa. No. 1X	16.59 to 17.09
Basic (del'd east. Pa.)	16.00
Malleable	18.00 to 18.50
Stand. low phos. (f.o.b. east. Pa. furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	22.00 to 22.50

Va. No. 2 plain	22.01
Va. No. 2X	22.51

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 81c. to \$1.79 from eastern Pennsylvania furnaces; \$4.67 from Virginia furnaces.

CLEVELAND	
	Per gross ton at Cleveland furnace:
N'th'n No. 2 fdy. (local delivery)	\$15.50
S'th'n fdy., sil. 1.75 to 2.25	16.14
Malleable (local delivery)	15.50
Ohio silvery, 8 per cent	21.87
Stand. low phos., Valley	27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 55c. average local switching charge; \$3.12 from Jackson, Ohio; \$6.14 from Birmingham.

BIRMINGHAM	
	Per gross ton, f.o.b. Birmingham dist. furnaces:
No. 2 fdy., 1.75 to 2.25 sil.	\$11.00
No. 2 soft, 2.25 to 2.75 sil.	11.50
Basic	11.00

CANADA	
	Per gross ton:
Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	\$23.00 to 23.50

Ferromanganese	
	Per Gross Ton
Domestic, 80%, seaboard	*\$72.00 to \$75.00
Foreign, 80%, Atlantic or Gulf port, duty paid	*\$72.00 to 75.00

*Minimum price quoted for lots of 2000 tons or more.

Spiegelisen	
	Per Gross Ton Furnace
Domestic, 10 to 21%	\$26.00 to \$27.00

Electric Ferro-silicon	
	Per Gross Ton Delivered
50% (carloads)	\$77.50
50% (less carloads)	85.00
75% (carloads)	126.00
75% (less carloads)	136.00
14% to 16% (f.o.b. Welland, Ont., in carloads)	31.00
14% to 16% (less carloads)	36.00

Bessemer Ferro-silicon	
	F.o.b. Jackson County, Ohio, Furnace
Per Gross Ton	
10%	\$20.00
11%	21.00
12%	21.50
13%	22.50
14%	23.50
15%	24.00
16%	25.00
17%	26.50

Silvery Iron	
	F.o.b. Jackson County, Ohio, Furnace
Per Gross Ton	
6%	\$18.00
7%	18.50
8%	18.75
9%	19.00
10%	19.50
11%	20.00
12%	20.50
13%	21.00
14%	21.50
15%	22.00
16%	22.50
17%	23.00

Other Ferroalloys	
	Ferrotungsten, per lb. wo. del. carloads
	\$1.08

PITTSBURGH	
	Per gross ton delivered consumers' yards:
No. 1 heavy melting steel	\$9.75 to \$10.25
steel	8.50 to 8.75
No. 2 heavy melting steel	8.50 to 8.75
No. 2 railroad wrought	9.75 to 10.25
Scrap rails	8.50 to 8.75
Rails 3 ft. and under	11.50 to 12.00
Sheet bar crops, ordinary	10.00 to 10.50
Compressed sheet steel	9.25 to 9.75
Hand bundled sheet steel	8.00 to 8.50
Hot steel axle turnings	8.25 to 8.75
Machine shop turnings	6.50 to 7.00
Short shov. steel turnings	6.50 to 7.00
Short mixed borings and turnings	6.50 to 7.00
Cast iron borings	6.50 to 7.00
Cast iron car wheels	9.75 to 10.25
Heavy breakable cast	8.00 to 8.50
No. 1 cast	9.00 to 10.00
Rail. knuckles and couplers	10.50 to 11.00
Rail. coil and leaf springs	10.50 to 11.00
Roller steel wheels	10.50 to 11.00
Low phos. billet crops	13.00 to 13.50
Low phos. sheet bar crops	12.50 to 13.00
Low phos. plate scrap	11.00 to 11.50
Low phos. punchings	11.00 to 11.50
Steel car axles	15.00 to 15.50

CHICAGO	
	Delivered Chicago district consumers:
Per Gross Ton	
Heavy melting steel	\$6.75 to \$7.00
Shoveling steel	6.75 to 7.00

Ferrotungsten, less carloads	\$1.15 to 1.23
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	10.00c.
Ferrocromium, 2% carbon	17.00c. to 17.50c.
Ferrocromium, 1% carbon	19.00c. to 20.00c.
Ferrocromium, 0.10% carbon	23.50c. to 25.00c.
Ferrocromium, 0.06% carbon	25.50c. to 27.00c.
Ferrocromium, del. per lb. contained Va.	\$3.05 to \$3.30
Ferrocromiumtitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	160.00
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base	85.00
per gross ton	85.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	\$113.50
Silico spiegel, per ton, f.o.b. furnace, car lots	42.50
Ton lots or less, per ton	47.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	105.00
1% carbon grade	115.00
Spot prices	\$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	\$4.80
Old range non-Bessemer, 51.50% iron	4.85
Mesabi Bessemer, 51.50% iron	4.85
Mesabi non-Bessemer, 51.50% iron	4.80
High phosphorus, 51.50% iron	4.40
Foreign Ore, c.i.f. Philadelphia or Baltimore	

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	8c. to 8.50c.
Iron, low phos., Swedish, average 68% iron	9.00c.
Iron, basic or foundry, Swedish, average 65% iron	8.00c.
Iron, basic and foundry, Russian, aver. 65% iron (nom.)	9.00c.
Manganese, Caucasian, washed	24.00c.
Manganese, African, Indian, 50-52%	23c. to 24c.
Manganese, Brazilian, 46 to 48%	21c. to 22c.

Fluorspar	
	Per Net Ton
Domestic, washed gravel, 85-5, Kentucky and Illinois mines, freight allowed, Pittsburgh basis	\$20.31
No. 2 lump, 85-5, Kentucky and Illinois mines, freight allowed, Pittsburgh basis	22.31
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid, \$17.00	17.40
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines	32.00

Old Material

Frogs, switches and guards	6.75 to 7.00
Hydraulic comp. sheets	5.50 to 6.00
Drop forge flashings	5.00 to 5.50
No. 1 busheling	5.00 to 5.50
Roller car wheels	7.50 to 8.00
Railroad tires	9.00 to 9.50
Railroad leaf springs	8.50 to 9.00
Axle turnings	5.25 to 5.75
Steel couplers and knuckles	7.75 to 8.25
Coil springs	9.50 to 10.00
Axle turnings (elec. fur.)	6.00 to 6.50
Low phos. punchings	9.50 to 10.00
Low phos. plates, 12 in. and under	8.50 to 9.00
Cast iron borings	3.75 to 4.25
Short shoveling turnings	4.00 to 4.50
Machine shop turnings	3.50 to 4.00
Retrolling rails	9.00 to 9.50
Steel rails, less than 3 ft.	9.25 to 9.75
Steel rails, less than 2 ft.	9.50 to 10.00
Angle bars, steel	8.25 to 8.75
Cast iron car wheels	7.00 to 7.50
Railroad malleable	6.25 to 6.75
Agricultural malleable	5.75 to 6.25
*Relaying rails, 56 to 60 lb.	15.00 to 17.00
*Relay rails, 65 lb. and up	18.00 to 23.00
Per Net Ton	
Iron angle and splice bars	\$6.50 to \$7.00
Iron arch bars, transoms	6.50 to 7.00
Iron car axles	12.50 to 13.50
Steel car axles	9.00 to 9.50
No. 1 railroad wrought	5.50 to 6.00
No. 2 railroad wrought	6.25 to 6.50
No. 1 busheling	4.50 to 5.00

No. 2 busheling	2.50 to 3.00
Locomotive tires, smooth	8.00 to 9.00
Pipes and flues	3.25 to 3.75
No. 1 machinery cast	7.00 to 7.50
Automotive cast	6.75 to 7.25
No. 1 railroad cast	6.50 to 7.00
No. 1 agricultural cast	5.75 to 6.25
Stove plate	5.25 to 5.75
Grate bars	5.25 to 5.75
Brake shoes	6.75 to 7.25

*Relaying rails, including angle bars and match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$7.00 to \$7.50
No. 2 heavy melting steel	5.50 to 6.00
No. 1 railroad wrought	8.50 to 9.00
Bundled sheets	6.00 to 6.50
Hydraulic compressed, new	5.50 to 6.00
Hydraulic compressed, old	5.00 to 5.50
Machine shop turnings	4.00 to 4.50
Heavy axle turnings	6.00 to 6.50
Cast borings (nom.)	3.50 to 4.00
Heavy breakable cast	8.50 to 9.00
Stove plate (steel works)	7.00 to 7.50
No. 1 low phos. hvy.	9.00 to 10.00
Couplers and knuckles	8.50 to 9.00
Bolled steel wheels	8.00 to 8.50
No. 1 blast furnace	3.50 to 4.00
Spec. iron and steel pipe	7.50 to 8.00
Shafting	12.50 to 13.50
Steel axles	14.00 to 14.50
No. 1 forge fire	6.00 to 6.50
Cast iron car wheels	9.50 to 10.00
Cast iron cast (cupola size)	9.00 to 9.50
Cast borings (chem.)	10.00 to 11.00
Steel rails for rolling	9.50 to 10.00

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$7.00 to \$7.50
No. 2 heavy melting steel	6.50 to 7.00
Compressed sheet steel	7.00 to 7.50
Light bundled steel stampings	6.00 to 6.50
Drop forge flashings	6.00 to 6.25
Machine shop turnings	3.75 to 4.00
Short shoveling turnings	5.75 to 6.25
No. 1 busheling	6.50 to 6.75
Steel axle turnings	7.50 to 8.00
Low phos. billet crops	14.00 to 14.50
Cast iron borings	5.75 to 6.00
Mixed borings and short turnings	5.75 to 6.00
No. 2 busheling	5.75 to 6.00
No. 1 cast	8.00 to 8.50
Railroad grate bars	6.00 to 6.50
Stove plate	6.00 to 6.50
Rails under 3 ft.	12.00 to 12.50
Rails for rolling	11.00 to 12.00
Railroad malleable	9.50 to 10.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' yards:	
No. 1 heavy melting steel	\$7.50 to \$8.00
No. 2 heavy melting	6.00 to 6.50
Scrap rails	\$8.00 to 8.50
No. 1 hydraulic comp. sheets	5.00 to 5.50
Drop forge flashings	6.00 to 6.50
No. 1 busheling	6.00 to 6.50
Hvy. steel axle turnings	7.00 to 7.50
Machine shop turnings	5.00 to 5.50
Knuckles and couplers	10.00 to 10.50
Roll and leaf springs	10.00 to 10.50
Bolled steel wheels	10.00 to 10.50
Low phos. billet crops	10.50 to 11.00
Short shov. steel turnings	6.50 to 7.00
Short mixed borings and turnings	6.00 to 6.50
Cast iron borings	6.00 to 6.50
No. 2 busheling	3.50 to 4.00
Steel car axles	10.00 to 11.00
Iron axles	10.00 to 11.00
No. 1 machinery cast	9.25 to 9.75
No. 1 cupola cast	8.75 to 9.00
Stove plate	8.25 to 8.75
Steel rails, 3 ft. and under	10.50 to 11.00
Cast iron car wheels	8.00 to 9.00
Industrial malleable	8.00 to 9.00
Railroad malleable	8.00 to 9.00
Chemical borings	8.00 to 8.50

BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	\$7.50 to \$8.00
Scrap steel rails	7.50 to 8.00
Short shoveling turnings	3.50 to 4.00
Stove plate	6.00 to 6.50
Steel axles	12.00 to 12.50
Iron axles	12.00 to 12.50
No. 1 railroad wrought	9.00 to 9.50
Balls for rolling	9.00 to 9.50
No. 1 cast	8.50 to 9.00
Tramway wheels	8.50 to 9.00
Cast iron borings, chem.	8.50 to 9.00

ST. LOUIS

Dealers' buying prices per gross ton:	
Selected heavy steel	\$7.00 to \$7.50
No. 1 heavy melting	6.25 to 6.75
No. 2 heavy melting	5.75 to 6.25
No. 1 locomotive tires	6.00 to 6.50
Mix. stand-see. rails	6.50 to 7.00
Railroad springs	7.50 to 8.00
Bundled sheets	4.25 to 4.75
No. 2 railroad wrought	6.25 to 6.75
No. 1 busheling	5.50 to 6.00
Cast iron borings and shoveling turnings	4.75 to 5.25
Iron rails	7.00 to 8.00
Rails for rolling	8.50 to 9.00
Machine shop turnings	3.00 to 3.50
Heavy turnings	5.00 to 5.50
Steel car axles	9.50 to 10.00
Iron car axles	12.50 to 13.00
Wrought iron bars and trans.	5.00 to 5.50
No. 1 railroad wrought	4.75 to 5.25
Steel rails, less than 3 ft.	8.50 to 9.00
Steel angle bars	6.50 to 7.00

Cast iron car wheels	5.50 to 6.00
No. 1 machinery cast	7.50 to 8.00
Railroad malleable	5.00 to 5.50
No. 1 railroad cast	5.75 to 6.25
Stove plate	6.00 to 6.50
Relay, rails, 60 lb. and under	13.00 to 16.50
Relay, rails, 70 lb. and over	20.00 to 21.00
Agricult. malleable	5.00 to 5.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$4.25 to \$5.50
No. 2 heavy melting steel	2.75 to 3.00
Heavy melting steel (yard)	2.75 to 3.00
No. 1 hvy. breakable cast	4.75 to 5.00
Stove plate (steel works)	2.75 to 3.00
Machine shop turnings	1.00 to 1.50
Short shoveling turnings	1.00 to 1.50
Cast borings	1.00 to 1.50
No. 1 blast furnace	1.00 to 1.50
Steel car axles	10.00 to 10.50
Iron car axles (nom.)	14.00 to 14.50
Spec. iron and steel pipe	2.75 to 3.00
Forge fire	3.25 to 3.50
No. 1 railroad wrought	4.75 to 5.00
No. 1 yard wrought, long	3.75 to 4.00
Rails for rolling	6.00 to 6.25
No. 1 cast	3.50 to 3.75
No. 2 cast	4.50 to 5.00
Stove plate (foundry)	3.50 to 4.00
Malleable cast (railroad)	3.50 to 4.00
Cast borings (chemical)	6.00 to 6.50

Per gross ton, delivered local foundries:	
No. 1 machinery cast	\$8.50 to 9.00
No. 1 hvy. cast (cupola size)	7.50 to 8.00
No. 2 cast	6.50 to 7.00

PITTSBURGH

Base per Lb.	
Plates	2.85c
Structural shapes	2.85c
Soft steel bars and small shapes	2.60c
Reinforcing steel bars	2.60c
Cold-finished and screw stock	3.10c
Rounds and hexagons	3.10c
Squares and flats	3.10c
Bands	2.95c
Hoops	2.60c
Hot-rolled annealed sheets (No. 24)	3.15c
25 or more bundles	3.15c
Galv. sheets (No. 24), 25 or more bundles	3.05c
Hot-rolled sheets (No. 10)	3.10c
Galv. corrug. sheets (No. 28) per square (less than 3750 lb.)	3.75c
Spikes, large	2.50c
Small	2.75c to 2.90c
Boat	2.40c
Track bolts, all sizes, per 100 count	70 and 10 per cent off list
Machine bolts, 100 count	70 and 10 per cent off list
Carriage bolts, 100 count	70 and 10 per cent off list
Nuts, all styles	73 and 10 per cent off list
Large rivets, base per 100 lb.	\$3.00
Wire, black, soft ann't'd, base per 100 lb.	2.75
Wire, galv. soft, base per 100 lb.	3.20
Common wire nails, per keg	2.35
Cement coated nails, per keg	2.35

*On plates, structural bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

CHICAGO

Base per Lb.	
Plates and structural shapes	3.00c
Soft steel bars	2.75c
Reinforcing bars, billet steel	1.75c
Rail steel reinforcement	1.55c to 1.65c
Cold-fn. steel bars and shafting	3.10c
Rounds and hexagons	3.10c
Flats and squares	3.60c
Bands, 3/4 in. (in Nos. 10 and 12 gages)	2.95c
Hoops (No. 14 gage and lighter)	3.50c
Hot-rolled annealed sheets (No. 22)	3.55c
Galv. sheets (No. 24)	4.10c
Hot-rolled sheets (No. 10)	3.20c
Spikes (3/4 in. and lighter)	3.45c
Track bolts	4.30c
Rivets, structural	3.75c
Rivets, boiler	3.75c

Per Cent Off List	
Machine bolts	73
Carriage bolts	73
Coach and lag screws	73
Hot-pressed nuts, sq. tap, or blank	73
Hot-pressed nuts, hex. tap, or blank	73
No. 8 black ann't'd wire, per 100 lb.	\$3.45
Com. wire nails, base per keg	2.30
Cement c'd nails, base per keg	2.30

NEW YORK

Base per Lb.	
Plates and struc. shapes	2.70c to 3.10c
Soft steel bars, small shapes	2.70c to 3.10c
Iron bars, Swed. charcoal	6.00c to 6.50c
Cold-fn. shafting and screw stock	3.40c
Rounds and hexagons	3.40c
Flats and squares	3.90c
Cold-roll. strip, soft and quarter hard	4.95c
Hoops	3.75c
Hot-rolled sheets (No. 10)	3.20c
Hot-rolled ann't'd sheets (No. 24)	3.60c
Galvanized sheets (No. 24)	4.00c
Long term sheets (No. 24)	5.00c
Standard tool steel	12.00c
Wire, black annealed (No. 10)	3.60c
Wire, galv. annealed (No. 10)	4.05c
Tire steel, 3/4 x 1/2 in. and larger	3.40c
Smooth finish, 1 to 2 1/2 x 1/4 in. and larger	3.75c
Open-hearth spring steel, bases	4.50c to 7.00c
Common wire nails, base, per keg	\$2.60

BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$4.00 to \$4.25
Scrap T rails	3.80 to 4.60
Machine shop turnings	.80 to 1.00
Cast iron borings	1.05 to 1.20
Bundled skeleton, long	2.00 to 2.50
Forge flashings	3.00 to 3.50
Blas. furnace scrap	0.90 to 1.00
Forge scrap	3.00 to 3.25
Shafting	9.50 to 10.00
Steel car axles	9.00 to 9.50
Wrought pipe	4.00 to 4.25
Rails for rolling	6.00 to 6.50
Cast iron borings, chemical	7.00 to 7.25

Per gross ton delivered consumers' yards:

Textile cast	\$7.00 to \$7.50
No. 1 machinery cast	7.50 to 8.00
Stove plate	5.00 to 5.25
Railroad malleable	10.50 to 11.00

CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel	\$6.00 to \$7.00
Scrap rails for melting	8.00 to 8.50
Loose sheet clippings	2.00 to 2.50
Bundled sheets	4.75 to 5.25
Cast iron borings	2.75 to 3.25
Machine shop turnings	3.25 to 3.75
No. 1 busheling	4.25 to 4.75
No. 2 busheling	2.50 to 3.00
Rails for rolling	9.00 to 9.50
No. 1 locomotive tires	8.50 to 9.00
Short rails	11.75 to 12.25
Cast iron car wheels	8.25 to 8.75
No. 1 machinery cast	10.00 to 10.50
No. 1 railroad cast	8.75 to 9.25

*No. 28 and lighter, 36 in. wide, 20c higher per 100 lb.

ST. LOUIS

Base per Lb.	
Plates and struc. shapes	3.25c
Bars, soft steel or iron	3.00c
Cold-fn. rounds, shafting, screw stock	3.35c
Hot-rolled annealed sheets (No. 24)	2.90c
Galv. sheets (No. 24)	4.75c
Hot-rolled sheets (No. 10)	2.45c
Black corrug. sheets (No. 24)	3.50c
Galv. corrug. sheets	4.00c
Structural rivets	4.00c
Boiler rivets	4.00c

Per Cent Off List

Tank rivets, 3/4-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	73
Carriage bolts	73
Lag screws	73
Hot-pressed nuts, sq. blank or tapped, 200 lb. or more	73
Less than 200 lb.	63
Hot-pressed nuts, hex. blank or tapped, 200 lb. or more	73
Less than 200 lb.	63

PHILADELPHIA

Base per Lb.	
Plates, 3/4-in. and heavier	2.45c
Structural shapes	2.45c
Soft steel bars, small shapes, iron bars (except bands)	2.45c
Reinforce. steel bars, sq. twisted and deform.	2.30c
Cold-fn. steel, rounds and hex.	3.30c
Cold-fn. steel, sq. and flats	3.80c
Steel hoops	3.00c
Steel bands, No. 12 to 3/16-in., incl.	2.75c
Spring steel	5.00c
Hot-rolled annealed sheets (No. 24)	3.55c
Galvanized sheets (No. 24)	3.75c
Hot-rolled and annealed sheets (No. 10)	3.05c
Diam. pat. floor plates, 3/4 in.	5.00c
Swedish iron bars	6.00c

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

CLEVELAND

Base per Lb.	
Plates and struc. shapes	2.95c
Soft steel bars	2.75c
Reinforce. steel bars	1.75c to 1.95c
Cold-fn. rounds and hex.	3.10c
Cold-fn. flats and sq.	3.60c
Hoops and bands, No. 12 to 3/16 in., inclusive	2.90c
Hot-rolled annealed sheets (No. 24)	3.55c
Galvanized sheets (No. 24)	3.75c
Hot-rolled sheets (No. 10)	3.00c
Black ann't'd wire, per 100 lb.	\$2.75
No. 9 galv. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.35

*Net base, including boxing and cutting to length.

CINCINNATI

Base per Lb.	
Plates and struc. shapes	3.25c
Bars, soft steel or iron	3.00c
New billet reinforce. bars	3.00c
Rails steel reinforce. bars	3.00c
Hoops	3.90c
Bands	3.20c

Burnt cast	4.25 to 4.75
Stove plate	4.25 to 4.75
Agricultural malleable	8.00 to 8.50
Railroad malleable	9.00 to 9.50

DETROIT

Dealers' buying prices per gross per ton:	
Hvy. melting	\$5.75 to \$6.25
Borings and short turnings	4.00 to 4.50
Long turnings	3.00 to 3.50
No. 1 machinery cast	8.50 to 9.00
Automotive cast	10.75 to 11.25
Hydraulic comp. sheets	5.75 to 6.25
Stove plate	4.50 to 5.00
New No. 1 busheling	4.50 to 5.00
Old No. 2 busheling	3.00 to 3.50
Sheet clippings	3.00 to 3.50
Flashings	4.75 to 5.25

CANADA

Dealers' buying prices per gross per ton:	
Toronto Montreal	
Heavy melting steel	\$7.00 \$6.00
Rails, scrap	7.00 6.00
No. 1 wrought	7.00 8.00
Machine shop turnings	2.00 2.00
Boiler plate	5.00 4.50
Heavy axle turnings	2.50 2.50
Cast borings	2.00 2.00
Steel borings	2.00 2.00
Wrought pipe	2.00 2.00
Steel axles	7.00 9.00
Axles, wrought iron	7.00 11.00
No. 1 machinery cast	12.50 10.00
Stove plate	10.00 8.00
Standard car wheels	11.00 8.50
Malleable	10.00 8.00

BUFFALO

Base per Lb.	
Plates and struc. shapes	3.25c
Soft steel bars	3.00c
Reinforcing bars	2.65c
Cold-fn. flats and sq.	3.65c
Rounds and hex.	3.15c
Cold-rolled strip steel	5.25c

PLANT EXPANSION AND EQUIPMENT BUYING

Machine Tool Sales in March at New Low

Last Month Was Poorest of Depression, According to National Machine Tool Builders' Association

MARCH was the poorest month in machine tool sales in the depression period, according to the report of the National Machine Tool Builders' Association. The index figure of sales in March is 32.6, compared with 37.6 in February, the previous low month, and 59.1 in January. March sales were only 28 per cent of those in the same month last year. The National Machine Tool Builders' Association derives its base 100 from the average of shipments in 1922, 1923 and 1924.

The three-months' moving average of the association has declined to 43.1 from 54.8 in the preceding month. A number of companies increased their shipments during

March, which, with lower volume of new sales, brought the figure on unfilled orders down to 63.9 from 97.1 at the end of February. Unfilled orders were only 1.23 times shipments as of March 31, against a figure of 2.20 a month before.

During the early part of 1931 machine tool sales showed a steady increase up to and including May. The index figures for the first five months last year were 65.3, 73.1, 89.4, 102.1 and 103.3. From last May there has been an almost continuous decline, marked by only two rises, in December last, when the figure increased to 54.3 from 50.4 in November, and in January, this year, where there was a further increase to 59.2.

The advances in December and January undoubtedly reflected the opinion of many manufacturers that business would revive in the early part of this year. When January disclosed a very small improvement in some lines and none at all in others, the downward trend set in again in February, followed by the March slump.

Dullness continues this month. It is doubtful whether April will show any improvement over March, and it may show a decline. An automobile company has bought four lathes. The Ford Motor Co. is inquiring for equipment for crankshaft work. The Dravo Contracting Co., Neville Island, Pittsburgh, has bought a 48-in. Gray planer.

◀ NORTH ATLANTIC ▶

Peerless Weighing Machine Co., 245 Fifth Avenue, New York, an interest of General Vending Corp., same address, manufacturer of automatic weighing and vending machines, parts, etc., has leased factory at Forty-third Avenue and Queens Boulevard, Long Island City, on 16,500-sq. ft. site, for new plant for vending equipment production, repairs and service.

Albany Elevator Co., Albany, N. Y., now being organized by A. R. Roberts, Toronto, and associates is concluding arrangements with Albany Port Commission, 74 Chapel Street, for lease of new terminal grain elevator to cost about \$850,000 with unloading, conveying and other mechanical equipment. Arnold G. Chapman, chief engineer of commission, is in charge.

Bureau of Supplies and Accounts, Navy Department, Washington, and Navy Yard, Brooklyn, asks bids until April 26 for quantity of bronze flexible steam hose (Schedule 7837), and seven corrosion resisting steel reducing valves (Schedule 7902) for Brooklyn navy yard.

B. & S. Metal Works, Inc., New York, has been organized by Samuel Rubin, 910 Jennings Street, Bronx, and Charles Schlam, 126 St. Marks Place, New York, to manufacture metal products.

Stutz Motor Car Co., 16 West Sixty-first Street, New York, manufacturer of automobiles with plant at Indianapolis, leased building at 239-49 West Sixty-sixth Street for service and repair plant.

Board of Transportation, 250 Hudson Street, New York, John H. Delaney, chairman, asks bids until April 26 for electric heating and ventilating equipment, station and tunnel lighting equipment, etc., for subway system from Smith and Ninth Streets to Church Avenue, Brooklyn; also for ventilation equipment from Hudson Terminal to Jay Street, and Concord Street to Avenue C, New York and Brooklyn.

Robert Gair Co., 420 Lexington Avenue, New York, manufacturer of cardboard, corrugated and fiberboard boxes and containers, with main plant at Piermont, N. Y., is arranging for recapitalization of company to provide funds for expansion, including acquisition of other manufacturing units.

Cold Spring Mfg. Corp., Cold Spring, N. Y.,

has been organized by Edwin H. Pugh, 124 Fishkill Avenue, and J. Bennett Southard, Jr., Cold Spring, to manufacture machinery and parts.

Sound Engineering Corp., New York, recently organized, will be associated with Loftin-White Laboratory, 11 West Forty-second Street, to manufacture communication and sound equipment. Edward H. Loftin and S. Young White, both of company noted, head new organization. Loftin-White company specializes in production and development of sound amplifiers, parts, etc.

Merck & Co., Inc., Lincoln Avenue, Rahway, N. J., manufacturer of industrial chemicals, has filed plans for a two-story addition, 100 x 200 ft., to cost about \$80,000 with equipment. Portion of unit will be equipped as a machine department.

National Sheet Metal Roofing Co., 339 Grand Street, Jersey City, N. J., has asked bids on general contract for one-story storage and distributing plant, 40 x 100 ft. Frank A. Reed, 1221 East Grand Street, Elizabeth, N. J., architect.

Pierson, McFarlane, Inc., Newark, N. J., care of Abraham Gurney, 1060 Broad Street, has been organized by James R. Pierson, New York, and Henry H. McFarlane, 240 Sinclair Place, Westfield, N. J., to manufacture metal products.

McDermott & Binda, 582 Bergenline Avenue, Union City, N. J., architects, have plans for one-story and basement industrial shop for company whose name is temporarily withheld. Cost over \$30,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 3 for 1200 bomb racks (Schedule 7854); speed indicators, spare parts, etc. (Schedule 7886) for Philadelphia Navy Yard.

American Manganese Bronze Co., Rhawn Street and Torresdale Avenue, Holmesburg, Philadelphia, has acquired all property, excepting real estate, of Paul S. Reeves & Co., 1415 Catharine Street, operating a metal and smelting works, and Caskey Brass & Bronze Works, Inc., Richmond and York Streets, manufacturer of brass, bronze and other metal products. Acquired companies are being removed to Holmesburg plant, where production will be concentrated.

Scranton Steel Products Corp., Scranton, Pa., has been organized by N. J. Sayers and David Landau, 606 Connell Building, to manu-

facture steel doors and partitions, steel shelving and kindred products.

Spencer Heater Co., Williamsport, Pa., a division of Cord Corp., Auburn, Ind., is running on an increased production schedule. Sales during first quarter of this year exceeded those for similar period a year ago by about 21 per cent.

Atlantic Ellis Co., Seaford, Del., shipyard and equipment have been purchased at public sale by Thomas H. Drandorff, Seaford, naval architect, formerly superintendent at plant, and associates. New company will be organized and operations resumed for construction of steel vessels and barges, similar to line of output of Atlantic Ellis Co. Mr. Drandorff will be general manager.

Keystone Structural Steel Co., Trenton, N. J., care of Frank Transue, Trenton Trust Building, has been organized by George Brauch and Robert M. Barbour, Yardley, Pa., with capital of \$200,000, to operate a steel fabricating plant.

International Casement Co., Inc., Jamestown, N. Y., manufacturer of steel windows, frames, doors, etc., has acquired property and business of Henry Hope & Sons, Inc., 101 Park Avenue, New York, manufacturer of kindred products. A new company is being formed under name of Hopes Windows, Inc., with capital of \$1,000,000, to take over both companies. Production will be concentrated at Jamestown plant. Major Frank G. Garratt, head of International company, will be president and general manager.

Quartermaster, Fort Niagara, N. Y., asks bids until April 26 for six transformers (Circular 19).

Union Steel Chest Corp., LeRoy, N. Y., has been incorporated to take over assets of Union Chest & Cabinet Corp., Rochester, N. Y., sold at a receiver's sale on April 7. William Noonan, vice-president of Baltimore & Ohio Railroad, and J. Craig Powers, vice-president of Rochester Trust & Safety Deposit Co., are identified with new company.

◀ SOUTH ATLANTIC ▶

Board of Awards, Office of City Register, City Hall, Baltimore, asks bids until April 27 for pumping machinery and auxiliary equipment for Towson automatic pumping station. Leon Small, water engineer, Municipal Office Building, in charge.

Board of District Commissioners, District



A SCREW STOCK *that invites* COMPARISON

CARNEGIE CARBON MANGANESE SCREW STOCK meets the demand for a dependable case hardening steel which at the same time must possess superior free cutting quality. The high manganese content increases the rate of carbon penetration, reducing carburizing time and producing a fine grained, uniformly hard case of properly graded carbon content together with a tough core. Increased machining output is assured through less frequent grinding of tools, longer tool life and closer maintenance of size. Higher carbon grades than the carburizing grade are also obtainable up to .50

carbon. These steels, after suitable heat treatment, show physical properties comparable with many alloy steels and possess extraordinarily free cutting qualities.

Carnegie Carbon Manganese Screw Steels may be obtained in cold drawn and turned bars from the leading cold drawn and shafting concerns. Make a comparative test of these steels with those you have been using and demonstrate to your own satisfaction the economy and improved quality of your product resulting from the use of Carnegie Carbon Manganese Screw Stock.



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CARNEGIE

CARBON MANGANESE STEELS

Building Washington, asks bids until May 2 for quantity of iron furnace castings, fittings, etc.

Tucker County Mining & Development Co., Parsons, W. Va., care of R. V. Wilson, Parsons, secretary-treasurer, recently organized, has leased about 600 acres of gold ore properties at Porterwood, near Parsons, and plans installation of mining plant with initial capacity of about 60 tons of ore a day. Cost over \$50,000 with machinery. Elmer Phillips and O. A. Miller, both of Parsons, will be president and vice-president, respectively.

Purchasing Agent, Post Office Department, Washington, asks bids until April 27 for 325 1/4-hp. motors.

Raine Lumber & Coal Co., Clover Lick, W. Va., recently organized by officials of Raine Lumber Co., same place, to succeed to that company, is planning development of coal lands at Due, Greenbrier County, where about 2000 acres has been secured. A large tippie will be built, and coal mining plant, with conveying, loading and other equipment installed. Cost over \$60,000. J. W. Raine, general manager, is in charge.

House Naval Committee, House of Representatives, Washington, has approved bill to permit sale of naval ordnance plant at South Charleston, W. Va. Appraisals of present value are from \$5,000,000 to \$6,000,000.

Quartermaster, Fort Moultrie, S. C., asks bids until May 10 for an electric distribution system.

Douglas Battery Mfg. Co., Winston-Salem, N. C., has been organized by G. Wilson Douglas, 1724 Virginia Road, and associates, to manufacture electric storage batteries and parts.

Kipplemead Lime Co., Kipplemead, Va., is planning installation of lime pulverizing and hydrating equipment and accessory machinery.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 26 for one motor-driven acetylene compressor (Schedule 7845) for Norfolk Navy Yard, quantity of pressure indicators for Hampton Roads, San Diego and Mare Island yards (Schedule 7821), vacuum tubes for Brooklyn and Mare Island yards (Schedule 7856); until May 3 for wire rope and seizing wire for Eastern and Western yards (Schedule 7834), circuit breakers for Philadelphia and Mare Island Navy Yards (Schedule 7867), 440 turret rollers for Brooklyn yard, 440 for Philadelphia yard, and 440 for Puget Sound yard (Schedule 7844).

Division of Purchases and Sales, Department of Commerce, Washington, asks bids until April 25 for 10 to 30 engine-generator sets and auxiliaries (Proposal 24252).

◀ CENTRAL DISTRICT ▶

Westinghouse Electric & Mfg. Co., East Pittsburgh, has organized Westinghouse Neon Co., with Canadian interests, to operate plant at Hamilton, Ont., for manufacture of tube and other electric lighting equipment. Paul J. Myler is president E. C. Gould, vice president and general manager.

Crew Levick Co., 807 Main Street, Meadville, Pa., oil products, gasoline, etc., is considering new bulk oil storage and distributing plant. Cost about \$30,000 with equipment. Company plans rebuilding part of refinery at Titusville, Pa., recently damaged by fire.

Charles Schenkemeyer & Sons, Inc., Johnstown, Pa., has been organized by William, Louis and Edward A. Schenkemeyer, 1411 Conner Avenue, to manufacture gas and electric fixtures and kindred products.

Cashion Slag Co., Butler, Pa., is considering new loading and distributing dock at Donora, Pa., with elevating, conveying and other mechanical equipment. Cost about \$40,000 with machinery.

Cleveland Heater Co., 1900 West 112th Street, Cleveland, manufacturer of automatic gas and electric water heaters, parts, etc., has plans for one-story addition, 100 x 239 ft. George S. Rider Co., Marshall Building, is architect and engineer.

City Council, Norwalk, Ohio, asks bids until May 7 for equipment for sewage disposal plant. Cost about \$200,000.

Main Engineering & Construction Co., Columbus, Ohio, care of C. H. Valentine, 203 Columbian Building, has been organized with capital of \$50,000 by F. R. Main and C. M. Rose to manufacture engineering and mechanical products.

Ohio Electric Power Co., Sidney, Ohio, has applied for permission to issue bonds and stock in amount of \$11,437,000, fund to be used for acquisition of group of electric light and power companies in Ohio, and for exten-

sions and improvements, including transmission lines.

Department of Public Works, Division of Highways, O. W. Merrill, director, Ohio-Hartman Building, Columbus, Ohio, plans early call for bids on revised plans for three-story and basement addition to experiment and testing station at Ohio State University, 93 x 114 ft. Cost about \$90,000. Installation will include a traveling crane and other heavy equipment. Bids recently received have been rejected. Howard Dwight Smith, Brown Hall, Ohio State University, Columbus, architect.

Air-Way Electric Appliance Corp., 2101 Auburn Avenue, Toledo, Ohio, manufacturer of electrical appliances, vacuum cleaners, etc., has organized Airway, Ltd., to manufacture for Canadian trade. Property has been leased at Windsor, Ont., and plant will be equipped at once.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until April 26 for two air compressors, one air receiver, and one after cooler (Circular 358).

Quaker Oats Co., 141 West Jackson Boulevard, Chicago, has plans for new grain elevator at Akron, Ohio, plant, with 36 storage tank units, elevating, screening, conveying and other equipment. Cost about \$275,000 with machinery. F. J. Palmer, manager at Akron.

Stanley's Auto Parts, Inc., Cincinnati, care of Edwin G. Becker, 611 American Building, has been organized by Stanley C. Felthaus and Frank J. Donovan to manufacture automobile parts and kindred mechanical specialties.

Eaton Mfg. Co., 739 East 140th Street, Cleveland, formerly Eaton Axle & Spring Co., manufacturer of automobile equipment and parts, is increasing production schedule. Company has large order for bumpers for Plymouth automobile.

Electric Auto-Lite Co., Champlain and Mulberry Streets, Toledo, Ohio, is advancing output in electric clock manufacturing division, recalling a number of workers. Company has recently secured large order for clock units from Ivanhoe Foods, Inc., Auburn, N. Y.

Board of Trustees, Purdue University, West Lafayette, Ind., has awarded general contract to A. E. Kemmer, Lafayette, Ind., for three-story and basement mechanical engineering school, second units, 60 x 236 ft. Cost about \$200,000 with equipment. Walter Scholer, Wallace Building, Lafayette, is architect.

Auto Equipment Co., Muncie, Ind., has been organized by Chester H. Sears and James H. Brammer, Muncie, to manufacture automobile equipment and parts.

Bendix Aviation Corp., South Bend, Ind., is increasing production in several departments, including manufacture of automatic clutch controls. Company has secured large contract for clutches for a popular-priced automobile.

Board of Trustees, DePauw University, Greencastle, Ind., plans installation of coal and ash-handling equipment, boiler, pumps and auxiliary equipment in connection with expansion and improvements at central power house, including one-story addition, 40 x 60 ft.

Hammond Aircraft Corp., Ann Arbor, Mich., recently organized, has acquired property on North Main Street, containing about 9000 sq. ft. of floor space, for manufacture of airplanes, including parts production and assembling. Company has purchased manufacturing rights of Parks Aircraft Corp., a division of Detroit Aircraft Corp., covering three models using 100, 135 and 165-hp. motors, respectively, all of open-cockpit type, and will specialize in this line at Ann Arbor works. Dean B. Hammond is president; Edwin F. Skocdopole will be manager.

City Council, Sturgis, Mich., has plans for a municipal hydroelectric power plant. Cost about \$100,000 with equipment. Ayres & Norris, Lewis & May, Ann Arbor, Mich., are consulting engineers.

Kelvinator Corp., 14250 Plymouth Street, Detroit, manufacturer of electric refrigerators, has acquired all assets and patent rights for manufacture of Rightway oil burners from Maise Corp., 1651 East Grand Boulevard, and will operate as unit.

Flint Nut Co., Flint, Mich., has been organized by Lawrence Rottenberg and Thomas H. Evans, 2033 Dime Bank Building, Detroit, to manufacture nuts, bolts, studs, automobile parts, etc.

L. A. Young Spring & Wire Corp., 9200 Russell Street, Detroit, manufacturer of automobile springs, wire products, etc., is advancing plant operations. March business was about 14 per cent over that of February.

Briggs Mfg. Co., River Rouge and Detroit, manufacturer of automobile bodies, has ad-

vanced production to highest point since last summer, and expects to increase present schedule for sport-type open and closed bodies, for which contracts have been secured for Hudson and Essex automobiles.

F. D. Hayes Electric Co., Lansing, Mich., is arranging for early commercial production of a recently patented electric door opener, perfected by Mason V. Green, superintendent at plant. Device opens and closes doors when person passes through a ray of light.

Fruehauf Trailer Co., 10940 Harper Avenue, Detroit, manufacturer of motor trailers and parts, has plans for improvements and alterations in plant. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Lawrence Lentz, care of T. O. Lentz, 133 Fallis Road, Columbus, Ohio, inventor of a device to remove foreign matter from gas and oil used in automotive engines, is arranging for plant facilities. Initial production of about 10,000 units a month is planned.

Zanesville Malleable Iron Co. plant, Zanesville, Ohio, will be sold at private sale, following a public auction at which no bidders appeared.

◀ MIDDLE WEST ▶

City Council, Geneva, Ill., plans installation of 300,000-gal. elevated steel tank on tower, in connection with improvements in municipal waterworks. Wells Engineering Co., Court House, engineer.

City Council, Marshall, Minn., has surveys under way for municipal electric light and power plant. Cost about \$100,000 with equipment. G. M. Orr Co., Baker Building, Minneapolis, Minn., is consulting engineer.

Mississippi Foundry Corp., 1700 First Street, Rock Island, Ill., has been organized by officials of Gellman Mfg. Co., same address, manufacturer of wrenches, tools, etc., with capital of \$40,000, to produce iron and other metal castings. A. W. and I. C. Gellman are heads.

Senate Irrigation Committee of United States Senate, Washington, has approved Kendrick bill authorizing construction of Casper-Alcova power and irrigation project, Wyoming, to cost \$15,000,000. Project will include hydroelectric power development, pumping plants, etc. Bureau of Reclamation, Denver, will be in charge.

Village Council, St. Louis Park, Minn., Herbert Carleton, village recorder, asks bids until April 25 for 100,000-gal. steel tank on 125-ft. steel tower for municipal water system. Alexander & Bradley, New York Life Building, Minneapolis, are engineers.

City Council, Lenox, Iowa, will have plans drawn for a municipal electric light and power plant. Proposition has been approved at special election.

Western Sheet Steel Co., Cicero, Chicago, has been organized to take over and expand company of same name, with local plant at 1550 South Forty-ninth Avenue. Charles Miller is one of principal incorporators.

Board of Water Commissioners, Denver, is planning installation of electric-operated pumping station. Cost over \$150,000 with equipment. R. Ewing Stiffler, 1925 Ivanhoe Street, engineer.

Minnesota Fence & Wire Works, 240-2 University Avenue, Minneapolis, has plans for alterations and improvements in plant. Max O. Buetow, 1380 Blair Street, is architect.

Barnsdall Corp., 59 East Van Buren Street, Chicago, operating Barnsdall Refineries, Inc., same address, with main plant at Barnsdall, Okla., has taken over Mona-Motor Oil Co., Council Bluffs, Iowa, with which it has been identified, and will operate as complete unit, developing storage and distributing facilities in different districts. Mona-Motor company also operates at Toledo, Ohio, and vicinity.

Grigsby-Grunow Co., 2038 North Kolmar Avenue, Chicago, manufacturer of radio equipment and parts, has developed new line of electric-operated refrigerators and is operating division on basis of about 700 refrigerator units daily, to be increased soon. Radio manufacture has been curtailed; operations in that line are scheduled to resume about May 1, reinstating a number of workers.

Common Council, Shenandoah, Iowa, plans installation of power and pumping machinery in connection with waterworks expansion, including 300-gal. per min. turbine pump with accessories, and 150-hp. Diesel engine, generator set.

Common Council, Granite Falls, Minn., plans extensions and improvements in municipal electric power plant, including waterwheels and auxiliary hydroelectric equipment. Cost

SAVINGS

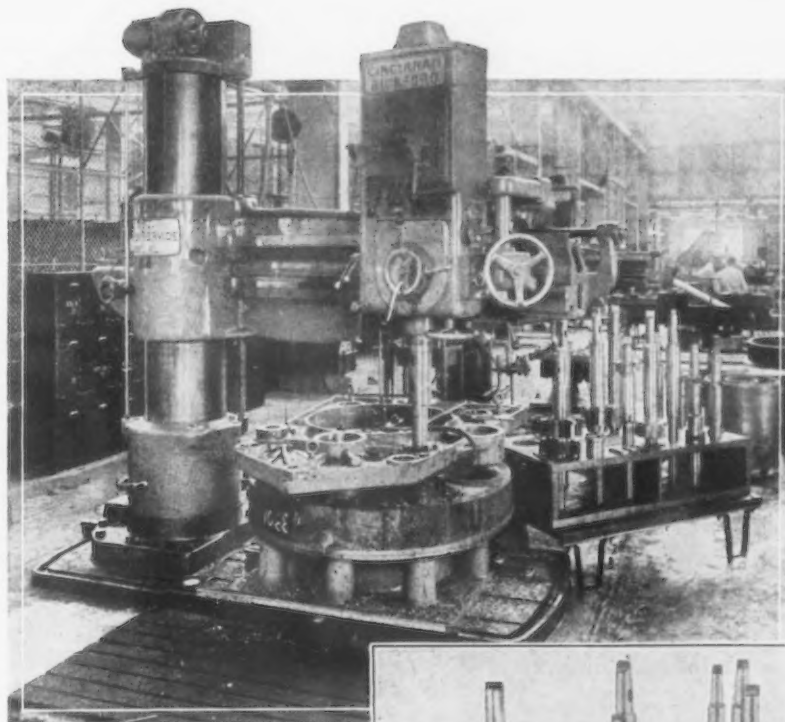
Exceeded Expectations!

A time-saving change in production method does not necessarily demand the use of single purpose machine tools.

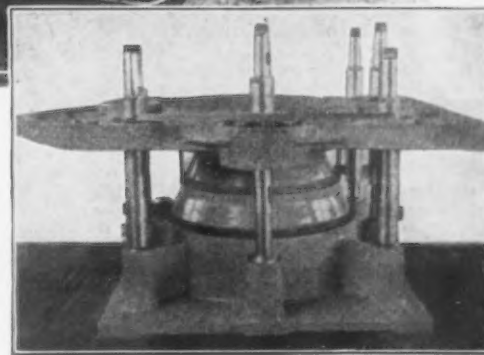
The Doheny Stone Drill Company figured it out this way. They had been drilling, boring, reaming and facing their cast steel crossheads for deep well drills on a boring mill, and the time required was 113 hours.

They put the question mark on those operations and decided to tool up with a fixture and suitable small tool equipment. This decision indicated that a Super-Service Radial could be more readily adapted to fixture operation than the former boring mill, and so the change was made. Illustrated here are the Super-Service Radials and the tooling equipment.

The result not merely justified the change—it was al-



The SUPER-SERVICE Radial at the Doheny Stone Drill Co., Los Angeles, California, equipped to drill, bore, ream and face cast steel crossheads for hydraulic deep well drills. With the equipment shown, this job is completed in one-fifth of the time formerly required.



most a revelation. The machining time was cut from 113 hours to 22 hours.

Put the question mark on

some of your operations, and we will show you how a Super-Service Radial can take over other jobs and save you some real money.

THE CINCINNATI BICKFORD TOOL CO., CINCINNATI, OHIO

The SUPER ~ SERVICE Radial

about \$25,000. G. M. Orr & Co., Baker Building, Minneapolis, are consulting engineers.

Calumet Steel Co., 33 North La Salle Street, Chicago, has arranged for change of name to Porter Steel Co.

Froedtert Grain & Malting Co., South Thirty eighth and West Grant Streets, Milwaukee, will start work May 15 on power plant addition to cost \$50,000 and will place contracts some time thereafter for additional grain tanks to increase elevator capacity by 1,000,000 bu.

Sieberts & Risch Pattern Works, 1500 West National Avenue, Milwaukee, has leased adjoining building for extension of production.

Menomonee Falls, Wis., has rejected bids opened March 30 and is asking new bids until April 25 for construction of pumping station and furnishing one 500 g.p.m. deep well turbine, electric motor-driven pump, one 500 g.p.m. electric motor-driven centrifugal booster pumps with automatic control, pressure regulator, etc. Walter H. Meyer is clerk.

George C. Jordan, 3003 South Superior Street, Milwaukee, has leased building at 3217 South Clement Avenue for general sheet metal production.

◀ NEW ENGLAND ▶

Riggs & Lombard, Lowell, Mass., recently organized to manufacture textile wet finishing equipment, including vacuum extractors, fulling machines, bleach tubs, dye kettles, etc., has leased 11,000 sq. ft. space in mill of Lawrence Mfg. Co. New company is headed by H. C. Riggs, formerly in charge of textile division of Rodney Hunt Machine Co., Orange, Mass., and C. J. Lombard, also connected with last noted organization.

Barrett Co., Everett, Mass., manufacturer of roofing products, etc., with headquarters at 40 Rector Street, New York, plans erection of new plant on 14-acre tract at Malden, Mass., including storage and distributing unit with battery of 20 steel tanks for fuel oil and gasoline service. Cost over \$100,000 with equipment. Everett plant will be removed to new location.

Essem Packing Co., 101 Beacon Street, Lawrence, Mass., meat packer, let general contract to L. C. Cyr, 45 Melrose Street, for two-story addition and improvements in present plant. Cost over \$40,000 with equipment.

Michalk Shoe Machinery Corp., Boston, has been organized by Otto Michalk and Thomas H. Glennon, Jr., 84 Butler Street, Revere, Mass., to manufacture shoemaking machinery and parts.

Waterbury Clock Co., Waterbury, Conn., is running on maximum production for manufacture of electric clocks. All departments are on 9-hr., 7-day week basis, with full working quotas, and some divisions on overtime schedule. Company recently received single order for 75,000 clocks of same model.

Kuniholm Mfg. Co., Gardner, Mass., plans rebuilding of Riverside nickel-plating plant, totaling about 18,000 sq. ft. floor space, recently destroyed by fire.

Crompton & Knowles Loom Works, Worcester, Mass., manufacturer of textile looms and equipment, is planning centralization of different divisions at local plant and will remove certain branches from Rhode Island and other points, increasing facilities at Worcester works. John Tinsley, general manager.

East Coast Ship & Yacht Building Co., Groton, Conn., is considering an addition at shipyard, including improvements in present boat-building and repair plant. Cost over \$30,000 with equipment.

◀ SOUTH CENTRAL ▶

Alabama Power Co., Birmingham, plans improvements in power substations and transmission lines to cost over \$75,000, including replacement of damage to steel tower and other high-tension lines as result of recent tornadoes.

Tennessee Coal, Iron & Railroad Co., Birmingham, is increasing operations at Ensley, Ala., mills, reinstating 1200 men who have been idle for several weeks.

Davison-Pick Fertilizers, Inc., Whitney Central Building, New Orleans, expects to complete plans late in May for new commercial fertilizer plant at Gretna, La., to replace unit recently destroyed by fire. Loss over \$125,000 with machinery. Company is a subsidiary of Davison Chemical Co., Baltimore Trust Building, Baltimore.

Covington Water Co., Covington, Ky., is considering purchase of valves, hydrants,

meters and other equipment for improvements and replacements in water system.

Sears, Roebuck & Co., North Parkway and Watkins Street, Memphis, Tenn., plan installation of eight or more gasoline pumping units, hydraulic lifts and other equipment in connection with addition to mail order plant, 130 x 130 ft.

Lafayette Compress & Warehouse Co., Lafayette, La., plans rebuilding cotton compress plant recently damaged by fire. Loss over \$120,000 with compresses and other equipment.

◀ SOUTHWEST ▶

Sieloff Packing Co., 4329 Natural Bridge Avenue, St. Louis, meat packer, let general contract to H. A. Haeseler Building & Construction Co., 2346 Palm Street, for condenser and engine building, 40 x 74 ft., and one-story top addition to main packing plant. Cost over \$50,000 with equipment. H. W. Tohtz, 5887 Wabada Street, is mechanical engineer.

Board of Education, 400 North Walnut Street, Oklahoma City, Okla., authorized erection of two-story and basement high school for colored students, with manual training department. Cost \$300,000 with equipment. T. J. Stearley is clerk of board, in charge.

Missouri Power & Light Co., Kansas City, Mo., plans extensions in transmission lines near Madison and Holliday, Mo., with distributing facilities. Cost over \$35,000.

Texas Pipe & Tool Co., Tulsa, Okla., has been organized by R. E. Sigmon, 734 North Trenton Street and associates to manufacture oil well tools and equipment.

Wirt Franklin Petroleum Corp., Ardmore, Okla., Wirt Franklin, president, has arranged for merger with Cromwell-Franklin Oil Co. and Virginia Petroleum Co. of Oklahoma, with oil properties in State. Will consolidate holdings and carry out expansion.

Gleaner Harvester Corp., Kansas City, Mo., has been organized with capital of \$500,000 to take over and succeed to Gleaner Combine Harvester Corp., Cottage and Hayward Streets, manufacturer of harvesting machinery and other agricultural equipment, recently in financial difficulty. Creditors' committee has purchased plant and equipment for \$270,000 and will transfer to new organization. W. J. Brace, heretofore receiver for company, will be president.

Board of Public Service, St. Louis, O. D. Tillay, secretary, has awarded general contract to Kaplan-McGowan Construction Co., American Trust Building, for one and two-story terminal and operating building at Lambert-St. Louis municipal airport, 66 x 198 ft. Cost over \$100,000 with equipment. Albert Osburn, architect, Department of Buildings and Bridges.

Magnolia Petroleum Co., Dallas, Tex., plans rebuilding part of oil refinery at Beaumont, Tex., recently destroyed by fire. Loss over \$200,000 with equipment.

Diamond Metal Co., Houston, Tex., has been organized by W. T. Touchton, 1554 Lawson Street, and associates to manufacture metal products.

Board of Trustees, Texas Agricultural and Mechanical College, College Station, Tex., has plans for another unit in expansion program, comprising four-story petroleum engineering building, 52 x 186 ft., with wing, 56 x 70 ft. Cost over \$200,000 with equipment. It is expected to begin superstructure in May. Dr. V. E. Giesecke is college architect.

Exporters' & Traders' Compress & Warehouse Co., Waco, Tex., plans rebuilding part of cotton compress plant at Marlin, Tex., recently destroyed by fire. Loss over \$225,000 with compresses and other machinery.

Purchasing Officer, Department of Interior, United States Indian Warehouse, St. Louis, asks bids until May 10 for boilers, kettles, scales, saws, steel wool, dutch ovens and other supplies (Schedule 15).

◀ PACIFIC COAST ▶

City Council, San Diego, Cal., has withdrawn recent call for bids for equipment for Diesel engine-operated electric light and power plant for service in downtown district, owing to improper method of legal procedure for station. New bids will be asked soon. A. V. Goeddel, city purchasing superintendent, is in charge.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 26 for one motor-driven engine lathe (Schedule 7799) for Mare Island yard.

Dyrekter Auto-Signal Corp., Los Angeles, care of Elias Mansfield, 714 Board of Trade Building, has been organized by Peter P. Gransgard and Lorenz F. Schader, Los Angeles, capital \$75,000, to manufacture signal devices and equipment.

International Smelting Co., Tooele, Utah, has resumed operations after period of curtailment, giving employment to about 500 men.

Pomeroy Oil Co., Pomeroy, Wash., recently organized by W. W. Richardson and W. J. Houser, Pomeroy, is considering erection of bulk oil storage and distributing plant.

Jumbo Plaster & Cement Co., Sigurd, Utah, has approved plans for rebuilding gypsum plaster and cement mill, recently destroyed by fire. Cost over \$200,000 with machinery.

Cass Foundry Co., Los Angeles, has been organized by R. L. Faulds and G. A. Bisbee to take over and expand company of same name at 2501 East Twenty-fifth Street.

Town Council, Marysville, Wash., is considering installation of motor-driven pumping machinery and auxiliary equipment in connection with municipal water system. Project will cost about \$100,000.

◀ CANADA ▶

Exide Batteries of Canada, Ltd., 153 Dufferin Street, Toronto, has awarded contracts in connection with erection of plant addition. R. G. Kirby & Sons, Ltd., 539 Yonge Street, is general contractor.

Canadian Gas & Equipment Co., Ltd., 4800 Seventh Avenue, Rosemount, Que., will erect manufacturing plant at Pointe Claire, Que. Cost about \$75,000.

B. C. Sugar Refining Co., Ltd., Vancouver Block, Vancouver, B. C., will start work immediately on erection of a \$40,000 addition to refinery at Raymond, Alta.

◀ FOREIGN ▶

Central Railroad of Brazil, Rio de Janeiro, owned and operated by Government, has authorized fund of \$1,500,000 for purchase of rolling stock, rails, tools and other machinery.

California-Texas Leasing Co., Los Angeles, care of James F. Sadler, 810½ South New Hampshire Avenue, is at head of project to build an oil refinery near Topolobampo, Sinaloa, Mexico, on Topolobampo Bay, to cost over \$250,000 with equipment. A similar unit is also being considered near Chihuahua, Mexico. A crude oil pipe line will be built from a point near Midland, Tex., to refinery sites. Presidio Petroleum Co., Presidio, Tex., recently organized by H. W. Rowe, Midland, is interested in project.

Société Anonyme Citroen, Ltd., Paris, France, head by Andre Citroen, manufacturer of automobiles, has secured license from Chrysler Corp., Detroit, for production of patented floating power engines and mountings as used in Chrysler automobiles. Manufacture will be carried at Citroen plants, including parts production and assembling, for Citroen cars.

Soviet Russian Government, Moscow, has approved plans for works at Kazan, Tatar Republic, for manufacture of heavy machinery, near railroad freight car works now under way. Initial buildings are scheduled to be ready for service in 1933; equipment will be provided for maximum working force of 70,000 persons. Cost about 300,000,000 rubles (approximately \$155,000,000) with machinery. Freight car plant will have capacity of 5000 standard type cars a year, and part of works will be completed by end of 1932. Cost 45,000,000 rubles (about \$23,000,000) with equipment. Amtorg Trading Corp., 261 Fifth Avenue, New York, is official buying agency.

Morris Machine Works, Baldwinsville, N. Y., manufacturer of centrifugal pumps, hydraulic dredges and steam engines, has moved its export office to 30 Church St., New York.

Alco Products, Inc., New York, has opened a new branch office in the Rialto Building, San Francisco, in charge of R. S. Danforth, whose territory includes all of California.

Norma-Hoffmann Bearings Corp., Stamford, Conn., manufacturer of ball, roller and thrust bearings, has removed its New York sales office from the Grand Central Terminal to larger quarters in the Commerce Building, 155 East Forty-fourth Street.

IRON ORE IN THE NEW WORLD



B RITISH adventurers who came early to the new world knew iron and searched here for ore. In 1603 the first iron ore mined in America was shipped from Jamestown to England. There it was smelted and seventeen tons of iron sold to the East India Company for £4 per ton. ***** Deposits of varying quality were found in other colonies. Including bog and brown hematite ores, iron has been found in 32 states. ***** In 1846 Dr. J. Long Cassels was sent to the Lake Superior country to prospect for copper and

came back with enthusiastic tales of rich iron ore. The Cleveland men he represented were of New England stock and knew iron. ***** A company was formed to investigate the discoveries of Dr. Cassels, other companies followed and the development of the world's greatest treasure of iron commenced. ***** The Lake Superior district contains 85% of the high grade merchantable ore in the United States with reserves estimated at nearly 1,500,000,000 tons, to say nothing of vast unestimated quantities of lower grade ores.

[Iron ore reserves of the Interlake Iron Corp. in Minnesota and Northern Michigan comprise practically every variety of high grade ore known. The proper mixture of ores for any given specification of pig iron can always be made, an advantage which is of utmost importance to the purchaser of pig iron.]

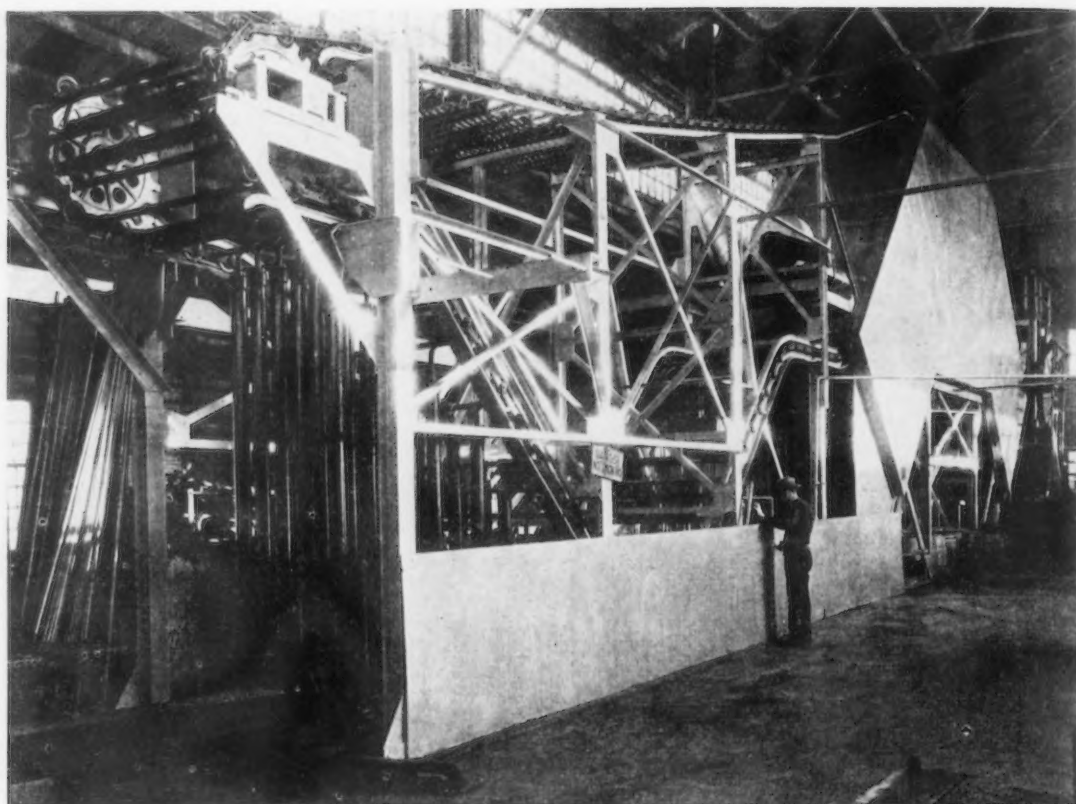
INTERLAKE IRON CORPORATION

PIG IRON / COKE

PICKANDS, MATHER & COMPANY, Sales Agents

CLEVELAND / CHICAGO / DETROIT / ERIE

PIPER that are black enameled inside and out are suspended from special hangers on a chain and bar conveyor, which immerses the conduits in the enamel and runs through a bake oven.



Makes Conduit by Continuous Gas Welding Process

(Concluded from page 922)

The process of dipping the conduit is controlled through guide bars and notched disks. These guide bars are bent to form half loops, the ends resting on the sides of the kettle so that the loops hang down in the molten spelter. A long drum, motor driven, is mounted on the top of the tank and forms a shaft for four notched disks of the same diameter as the loops and with notches to catch the pipes individually. When this drum is rotated the disks push the pipes from one side of the tank down through the flux and molten spelter, where it is coated inside and out, and up to the other side.

Here an operator picks up one end of each pipe as it comes out, passes it through a small steam blowing pipe in the shape of a ring and touches it to two motor driven magnetic rolls. The rolls pull it out of the tank and through the steam ring where the extra spelter is blown off and it is delivered to a rack or cooling table. At this point another operator places the bell mouth of a steam pipe over one end of each piece of conduit and blows out any extra spelter that may remain inside.

The pipe is then finished into conduit by threading, the coupling and

protectors are applied, and finally the inside is black enameled. This latter is accomplished by laying the conduits out on a rack and forcing the ends against nozzles in manifolds through which the black enamel is allowed to run. This enamel flows through the pipes and is caught in a tank at the other end. It is then baked on in a gas fired oven.

Those pipes that are black enameled inside and out are suspended from special hangers on a chain and bar type conveyor which runs through a bake oven. This conveyor is so de-

signed that the pipe first descends and is immersed in a tank of black enamel from which it gradually rises and is passed through a bake oven of the A-type. Gas burners furnish the heat, which is automatically maintained by temperature controllers. The baking period is regulated through the speed imparted to the conveyor by the motors operating it. Hence this coating and baking operation is continuous and automatic.

Electro galvanizing is accomplished by suspending the pipes from huge racks, which are handled by overhead cranes and hoists. With this equipment the pipes are submerged in deep electroplating vats where a coating of zinc is deposited, both inside and out, by electrolysis. The inside is then flooded with black enamel as previously described, and then is baked on.

Otis Completes 72-In. Continuous Sheet Mill

(Concluded from page 926)

eter. These will coil material up to 66 in. wide. Coils are discharged from the coilers on to chain conveyors, one for each coiler, located in a pit. These carry the coils across the end of the mill building—about 125 ft.—to the warehouse. Here they are picked up by an overhead crane. The coiled sheets then go to cold rolling mills.

The flying cold shear, which is of recent design, has rotary knives 72 in. long and will cut lengths of from 5 ft. to 20 ft. and sheets from 1/16 to 3/4 in. in thickness. It will cut 5 ft. to 10 ft. lengths in increments of 1/16 in. and with a tolerance in length of 1/16 in. plus or minus and lengths of 10 to 20 ft. in increments of 3/4 in. and

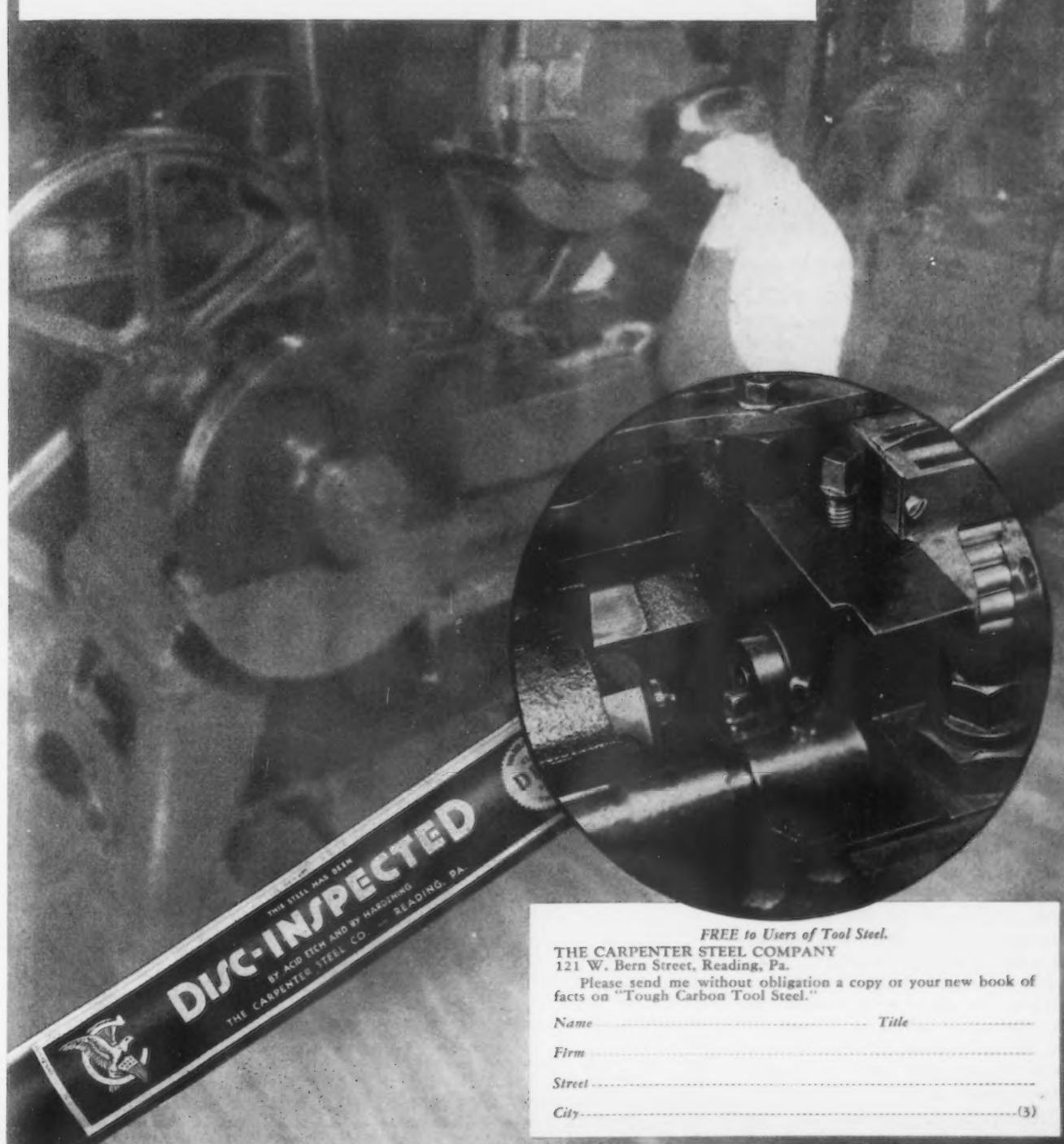
"These are the days it pays to be sure about your Tool Steel"

There's quite a difference between *thinking* you have the right tool steel and *knowing* you have the right tool steel.

Perhaps it was right for your purpose when you settled on it several years ago, but since then a new kind of tool steel has been developed by Carpenter—a straight carbon water-hardening tool steel of extreme toughness that will do more than anyone ever expected of straight carbon tool steel before.

You owe it to yourself and your management to try this new product—just as the manufacturing plant illustrated has tried and adopted it for the heading operation shown, because of its economies in the tool room, and its safety in hardening, to say nothing of increasing production from an average of 50,000 pieces per die, to 175,000 pieces per die. Send your next order for Water-Hardening Tool Steel to Carpenter.

THE CARPENTER STEEL COMPANY, Reading, Pa.



DISC-INSPECTED
THIS STEEL HAS BEEN
BY ACID TEST AND BY HARDENING
THE CARPENTER STEEL CO. - READING, PA.

FREE to Users of Tool Steel.
THE CARPENTER STEEL COMPANY
121 W. Bern Street, Reading, Pa.
Please send me without obligation a copy of your new book of
facts on "Tough Carbon Tool Steel."

Name..... Title.....
Firm.....
Street.....
City.....(3)

with a length tolerance of $\frac{1}{8}$ in. plus or minus.

From the cold run-out the sheet is drawn through pinch rolls and into a roller leveler, from which the material is fed into the shear. The shear operates automatically after being set for cutting in any desired length. The sheared pieces pass through a second set of pinch rolls and on to a piler, and the piled material is picked up by a crane.

The finishing mill stands are equipped with Timken tapered bearings on the backing up rolls and on the side opposite the drive on the working rolls. The other ends of the latter rolls have Messinger bearings.

Forced-grease lubrication is provided through Farval single and dual-line systems for about 1600 bearings. These include both automatic and hand-operated pumping units. All bearings requiring lubricating oil are connected with a central circulating system, which is provided with De Laval separators.

The mill stands, tables, hot bed, coilers, flying shear and other mill equipment were built by the United Engineering & Foundry Co. The mill motors and large motor-generator set were supplied by the General Electric Co. The motor drives for the hot run-out, coilers, shears and some other small motor equipment were built by the Reliance Electric & Engineering Co. The reheating furnaces were erected by the Rust Engineering Co. The hydraulic pumps were built by the Worthington Pump & Machinery Corp.

Creep Tests on Cold-Drawn Bridge Wire

(Concluded from page 915)

behavior of this wire under long-continued tension. Twelve special machines were constructed for test purposes, the wires being mounted on semi-circular sheaves $19\frac{1}{2}$ in. in diameter for the purpose of observing creep. In each test the wires were loaded to 74,000 lb. to the sq. in., maintained for 24 hr. This was then raised to 94,000 lb. for a second 24 hr. and then to 113,000 lb. The maximum stress was maintained for two weeks in the case of some of the wires, and for two months in others.

Various methods of suspending the wires were employed, including various curvatures. While some differences were found in the respective rates of creep, corresponding with differing methods of mounting, it was concluded generally that the method of mounting had little bearing.

Some small creep, uncertain in amount, was observed during the

24-hr. tests at 74,000 and 94,000 lb. stresses. In tests for two weeks at a stress of 113,000 lb., the rate of creep diminished with the time. The length had not, however, stopped increasing in two weeks, but did cease growing after three weeks in the longer tests. Total extension averaged 0.023 per cent after two weeks and 0.024 per cent after two months.

Tensile tests made of wires which had been subjected to these creep tests showed, with few exceptions, that the ultimate strength had been improved as compared with the original condition. Wires so treated were wound into coils with a diameter of $19\frac{1}{2}$ in. and left coiled for months. Subsequent tests disclosed no injury from this procedure.

British Markets Dull Pending Budget and Tariff Action

Overseas Buying of Continental Steel Gains Moderately—Russia Buys More German Material

LONDON, ENGLAND, April 18 (By Cable).—The British iron and steel markets are dull pending the outcome of recommendations by the budget and tariff advisory boards. There is a slight revival in overseas buying of Continental material. India has bought Continental steel bars at 58s. sterling, f.o.b.

Tin plate is quiet. Makers are not pressing sales because, under the pooling arrangement, it is more advantageous to receive payments for idleness than to operate at current sales prices.

March exports of pig iron were 8000 tons, of which 250 tons was shipped to the United States. Exports of all kinds of iron and steel from Great Britain in March were 166,000 tons.

Distribution of orders for pipe for the Irak oil line is now announced as

follows: Stewart & Lloyds, Inc., of England, 35,000 tons; British Mannesmann, 10,000 tons; French Valenciennes and Maubeuge makers, 49,000 tons; Germany, 14,000 tons, and United States, 8000 tons.

German works have received additional orders for 50,000 tons of steel for Russia, making a total of 150,000 tons recently ordered. In addition, the Vereinigte works was awarded 10,000 tons of thin sheets for Russia.

Jugoslavia has prohibited the importation of iron and steel which domestic manufacturers are able to produce.

Foundry Equipment Orders Hold Gains

Foundry equipment bookings in March, represented by the index figure 27.5, were practically the same as in the preceding month, when total orders were the largest for any month since last October, according to the monthly survey of the Foundry Equipment Manufacturers Association. The March figure compares with that in February of 27.6; January, 20.5; December, 20.9; November, 17.2, and October, 44.8. The association takes its base 100 from the average monthly shipments in 1922, 1923 and 1924.

Pig iron production in Canada in 1931 amounted to 420,038 gross tons, according to the final report of Dominion Bureau of Statistics. This compares with 747,178 tons in 1930, 1,080,160 tons in 1929 and 1,037,727 tons in 1928. Imports of pig iron in 1931 totaled 7912 tons, a decline of 42 per cent from the total of 13,643 tons in 1930. Exports last year aggregated 2787 tons, compared with 593 tons in 1930. Producers' stocks of pig iron at the end of 1931 totaled 128,222 tons.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton		
Pig iron, export	£9 0s.	
Billets, open-hearth....	5 5	to £5 10s.
Black sheets, Japanese specifications.....	9 12	6d to 5 15
Tin plate, per base box	0 15	to 10 0
Steel bars, open-hearth	7 17½	to 8 7½
Beams, open-hearth....	7 7½	to 7 17½
Channels, open-hearth....	7 12½	to 8 2½
Angles, open-hearth....	7 7½	to 7 17½
Black sheets, No. 24 gage.....	8 0	to 8 10
Galvanized sheets, No. 24 gage.....	9 7	6 to 9 10

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at \$4.86		
Billets, Thomas.....	£2 2s. 6d	
Wire rods, No. 5 B.W.G.	4 10	
Black sheets, No. 31 gage, Japanese.....	11 5	
Steel bars, merchant....	2 4	
Beams, Thomas.....	2 5	
Angles, Thomas, 4-in. and larger.....	2 4	
Angles, small.....	2 6	
Hoops and strip steel over 6-in. base.....	3 5	
Wire, plain, No. 8.....	5 7½	
Wire, barbed, 4-pt., No. 10 B.W.G.	8 15	

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